

*John D. Matter*

SPECIAL EDITION

# Service Data Book

## SERVICE DATA

Engine...Chassis...  
Electrical...with  
Tolerances and  
Clearances



## WIRING DIAGRAMS

Starting, Lighting,  
Ignition Data



## TUNE UP

1938 Specifications

AUTOMOBILE  
DIGEST



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## AUTOMOBILE DIGEST

# SERVICE DATA BOOK

THE Wiring Diagrams, Test Data and Repair Specifications in this Manual are published to furnish service men with a ready source of reference, providing factory-approved service data on the models listed, that they may have authentic information on hand when the need arises.

Inasmuch as there is but one printing of each edition, readers are urged to preserve this and future copies of the Service Data Book. Each succeeding edition includes new models which take the place of the older ones, removed.

### NOTE!

	DC means	"dead center"
ATC or ATDC	"	"after top dead center"
ABC or ABDC	"	"after bottom dead center"
BTC or BTDC	"	"before top dead center"
BBC or BBDC	"	"before bottom dead center"
Timing in Inches (")	"	piston travel
Timing in Degrees (°)	"	flywheel rotation

## AUTOMOBILE DIGEST

THE MASTER JOURNAL OF COMPLETE AUTOMOTIVE SERVICE

Cincinnati, Ohio

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# 1938 Tune-Up Data

CAR MODEL and YEAR	Spark Plug Gap Inches	Breaker Gap Inches	SPARK TIMING			VALVE TIMING			TAPPET CLEARANCE		Rod and Piston Assembly Removed From A—Above, B—Bottom.	CARBURETOR		
			Spark Occurs ° T.D.C.	Number of Flywheel Teeth—Spark Occurs T.D.C.	Breaker Housing	Inlet Opens ° T.D.C.	Inlet Opens Flywheel Teeth T.D.C.	Inlet Tappet Gap Inches	Inlet—Inches	Exhaust—Inches		Make	Float Level Based on 3 lbs. maximum fuel pump pressure	Idle Adjustment Turns Open
AMERICAN BANTAM—M/60, 1938	.025	.022	...	...	Auto	19B	4½B	.006	.006H	.006H	A	Tillotson		.....
BUICK—Series 40, 1938, Marvel Carb.	.026	.0125-.0175	4B	1½B	Adv.	13B	5¼B	.015	.015H	.015H	A	Marvel	1½*	¾-1
BUICK—Series 40, 1938, Stromberg Carb.	.026	.0125-.0175	4B	1½B	Adv.	13B	5¼B	.015	.015H	.015H	A	Strom	1½*	1
BUICK—Series 60, 80, 90, 1938, Stromberg Carb.	.026	.0125-.0175	6B	2½B	Adv.	14B	6+B	.015	.015H	.015H	A	Strom	1½*	1¼
BUICK—Series 60, 80, 90, 1938, Marvel Carb.	.026	.0125-.0175	6B	2½B	Adv.	14B	6+B	.015	.015H	.015H	A	Marvel	¾*	¾
CADILLAC—Series 60, 60-S, 65&75, 1938	.027	.0125-.0175	5B	2½B	Adv.	T.D.C.	.....	Auto	Auto	Auto	A	Strom	5/8*	Note 4
CADILLAC—V-12, Series 90, 1938	.027	.0125-.0175	6B	2½B	Adv.	8B	3½B	Auto	Auto	Auto	..	Carter		14 .....
CHEVROLET—Master & Mas. De Luxe, 1938	.040	.018	5B	2B	Auto	9B	3½B	....	.006H	.013H	A	Carter	¾	3 1-2
CHRYSLER—Royal Six, 1938	.025	.020	T.D.C.	.....	Auto	8B	3¼B	.014	.008H	.010H	A	CarterB&B	5/64	9 ½-1¼
CHRYSLER—Imp. 8, 1938	.025	.018	3A	1¼A	Auto	2B	¾B	.011	.006H	.010H	A	Strom	5/8*	Note 4
CHRYSLER—Cust. Imp. 8, 1938	.025	.018	5A	2A	Auto	2B	¾B	.011	.006H	.010H	A	Strom	5/8*	Note 4
DE SOTO—S5, 1938	.025	.020	T.D.C.	.....	Auto	8B	3¼B	.014	.008H	.010H	A	CarterB&B	5/64	9 ½-1¼
DODGE—D8, 1938	.025	.020	4A	1¾A	Auto	6A	2¼A	.011	.006H	.008H	A	Strom	5/8*	Note 4
FORD—V8-60, 1938	.025	.014	4B	1½B	Auto	9½B	3¼B	.013	.013C	.013C	A	Strom	15/32*	Note 4
FORD—V8-85 Std. & De Luxe, 1938	.025	.014	4B	1½B	Auto	9½B	3¼B	.013	.013C	.013C	A	Strom	15/32*	Note 4
GRAHAM—Special & Supercharger, 1938	.025	.018	4B	1½B	Auto	4½B	1½B	.012	.010H	.010H	A	Marvel	1½*	Note 4
HUDSON—Terraplane 80, 81 & 88, 1938	.032	.020	T.D.C.	.....	Auto	10¾B	4B	.010	.006H	.008H	A	Carter	¾	3 ¼-1
HUDSON—Terraplane 82, 1938	.032	.020	T.D.C.	.....	Auto	10¾B	4B	.010	.006H	.008H	A	Carter	5/64	14 ¼-¾
HUDSON—Six, 83, 1938	.032	.020	T.D.C.	.....	Auto	10¾B	4B	.010	.006H	.008H	A	Carter	9/64	14 ¾-¾
HUDSON—Eight, 84, 85 & 87, 1938	.032	.020	T.D.C.	.....	Auto	10¾B	4B	.010	.006H	.008H	A	Carter	5/64	14 ¼-¾
HUPMOBILE—Six, Series E822, 1938	.029	.018-.020	7B	2+B	Auto	2B	¾B	.014	.010H	.013H	A	Carter	¾	3 ¾-1¼
HUPMOBILE—Eight, 1938	.029	.018-.020	7B	2+B	Auto	1A	½A	....	.006H	.013H	B	Carter	3/16	14 ¼-1
LA SALLE—38-50, 1938	.027	.0125-.0175	5B	2½B	Adv.	T.D.C.	.....	Auto	Auto	Auto	A	Carter	3/16	14 ¼-1
LINCOLN—Zephyr, 1938	.028	.014	4B	1¼B	Auto	19½B	6B	Auto	Auto	Auto	A	Strom	15/32*	Note 4
LINCOLN—V12, 1938	.025	.015	7B	2¼B	Auto	21B	6¼B	Auto	Auto	Auto	B	Strom	15/32*	Note 4
NASH—Lafayette Mas. & De Luxe, 1938	.025	.022	4B	1½B	Auto	.....	.....	.015	.015H	.015H	A	Strom	5/8*	Note 4
NASH—Amb. 6, 1938	.025	.022	4B	1½B	Auto	.....	.....	.015	.015H	.015H	A	Marvel	1½*	Note 4
NASH—Amb. 8, 1938	.025	.020	9B	2½B	Auto	.....	.....	.015	.015H	.015H	B	Strom	1½*	Note 4
OLDSMOBILE—Six, F38, 1938	.040	.020	T.D.C.	.....	Auto	5B	2B	.008	.008H	.011H	A	Carter	¾	3 1-1½
OLDSMOBILE—Eight, L38, 1938	.030	.015	2B	¾B	Auto	T.D.C.	.....	.008	.008H	.011H	A	Carter	9/64	14 ½-1¼
OLDSMOBILE—Six (Auto Trans.) 1938	.040	.020	T.D.C.	.....	Auto	5B	2B	.008	.008H	.011H	A	Carter	¾	3 ½-1
OLDSMOBILE—Eight, L38, 1938 (First run)	.030	.015	2B	¾B	Auto	T.D.C.	.....	.008	.008H	.011H	A	Carter	9/64	14 ¾-1¼
PACKARD—Six, 1937, H. C. Head	.028	.015	4-6B	1½-2½B	Auto	5B	1½B	.017	.007H	.010H	A	Chand. Groves	17/32*	¾
PACKARD—Six, Series 1600, 1938	.027	.020	4¼-6B	1½-2½B	Auto	1B	½+B	.015	.007H	.010H	A	Chand. Groves	17/32*	¾
PACKARD—6, Ser. 1600, 1938, H. C. Head	.027	.020	2¼-4B	1-1½B	Auto	1B	½+B	.015	.007H	.010H	A	Chand. Groves	17/32*	¾
PACKARD—8, Series 1601, 2, 1938	.027	.015	6-8B	2½-3B	Auto	1B	½+B	.015	.007H	.010H	A	Strom	15/32*	Note 4
PACKARD—8, Ser. 1601, 2, 1938, H. C. Head	.027	.015	2¼-4B	1-1½B	Auto	1B	½B	.015	.007H	.010H	A	Strom	15/32*	Note 4
PACKARD—8, Series 1603, 4, 5, 1938	.027	.015	6-8B	2½-3½B	Auto	30B	12½B	.006	.006H	.008H	A	Strom	5/8*	Note 4
PACKARD—12, Series 1607, 8, 1938	.027	.020	7B	2½B	Auto	T.D.C.	.....	Auto	Auto	Auto	A	Strom	9/16*	Note 4
PIERCE-ARROW—8, 1938	.023	.018	5B	1¾B	Ret.	5A	1¾A	.010	Auto	Auto	A	Strom	9/16*	Note 4
PIERCE-ARROW—12, 1938	.023	.018	5B	1¾B	Ret.	19B	6B	.004	Auto	Auto	A	Strom	9/16*	Note 4
PLYMOUTH—P5, 1938	.025	.020	4A	1¾A	Auto	6A	2¼A	.011	.006H	.008H	A	Chand. Groves	17/32*	¾
PLYMOUTH—P5, P6, 1938	.025	.020	4A	1¾A	Auto	6A	2¼A	.011	.006H	.008H	A	Carter	5/64	9 ½-1¼
PONTIAC—6, 1938	.025	.020	2-6B	¾-2½B	Auto	5B	2B	.015	.011-.013H	.011-.013H	A	Carter	¾	3 ¾-1¼
PONTIAC—8, 1938	.025	.015	2-6B	¾-2½B	Auto	5B	2B	.015	.011-.013H	.011-.013H	A	Carter	¾	3 ½-1
STUDEBAKER—Six, 7A, 1938	.025	.020	2B	¾B	Auto	15B	5½B	.020	.016C	.020C	A	Strom	5/8*	Note 4
STUDEBAKER—Com. Six, 8A, 1938	.025	.020	2B	¾B	Auto	15B	5½B	.020	.016C	.020C	A	Strom	5/8*	Note 4
STUDEBAKER—Pres. 8, 4C, 1938	.025	.020	T.D.C.	.....	Auto	15B	5½B	.020	.016C	.020C	A	Strom	5/8*	Note 4
WILLYS—38, 1938	.025	.020	5A	1¾A	Auto	T.D.C.	.....	.010	.004H	.006H	A	Tillotson	¾*	Note 11

## CARBURETOR NOTES

4—Turn adjusting screw in until engine begins to "lag" or run irregularly, then slowly turn out until engine begins to "roll." Finally turn in again just enough so that engine runs smoothly for idle throttle opening.

11—Carburetor has two adjustments. Main adjustment approximately 2¾ turns open. Idle adjustment 1 turn open.  
‡—Float bowl inverted.

\*Fuel level measured from top of float bowl to fuel level—not float level. In some cases based on pump pressure—9/16" or less, 2 lbs. pressure; above this 3 lbs. pressure.

NOTE: The figures referred to in the above table, as well as tune-up data on models prior to 1938 will be found on the last pages of the book, 44-47.



# Auburn 6, 1936

Model 654

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{16}$ ".  
Stroke— $4\frac{3}{4}$ ".  
Taxable H. P.—22.5.  
Displacement—210.0 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—85 at 3500 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—49 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—12 links lower side of chain between punch marks.  
Bearings—6.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0025"-.0035".

### CONNECTING RODS

End Clearance—.004"-.009".  
Dia. Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—16 qts.  
Pump Drive—Belt.  
Belt Size—V-type, 46" x  $\frac{3}{4}$ ".  
Belt Adjustment—Not specified.  
Pump Pack Adj.—None.

### CRANKSHAFT

No. Bearings—4.  
Material—Bronze back, babbitt lined.  
End Thrust Taken On—Rear main bearing.  
End Clearance—.003"-.006".  
Dia. Clearance—.002"-.00325".

### FUEL SYSTEM

Carburetor Make—Stromberg "EX22".  
Type—Downdraft single.  
Adjustment—Idle—turn out to enrich—in to lean.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—35-40 lbs. at 40 m.p.h.  
Adjustment—None.  
Winter Oil—S.A.E. No. 20W.  
Summer Oil—S.A.E. No. 30.

### PISTONS

Material—Alum. alloy, Invar strut.  
Clearance—Top—.020".  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—Comp., .006"-.012"; oil, .010"-.018".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width—1,  $\frac{1}{8}$ " and 1,  $\frac{3}{16}$ ".

### PISTON PINS

Type—Clamped in rod.  
Fit in Piston—Thumb push fit, piston heated.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—.342".  
Seat Angle—Int., 30°, Exh. 45°.  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006"-.008".  
Exhaust—.006"-.008".  
Guides Removable—Yes.  
Spring Pressure—Not specified.

## CHASSIS

### FRONT AXLE

Caster— $3\frac{1}{2}$ ° min., 4° max.  
Camber— $1\frac{1}{2}$ °.  
Toe-in— $\frac{1}{8}$ "- $\frac{3}{16}$ ".  
Kingpin Angle— $7\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lash—Not given.  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lubricant Capacity—Housing—4 pts., dual ratio 6 pts.

### TRANSMISSION

Make and Type—Warner synchro-mesh.  
Main Shaft Bearing Type and No.—N. D. 7509 and 7607.  
Countershaft Bearing Type and No.—Hyatt 93324.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $24\frac{9}{32}$ " x  $1\frac{1}{2}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing. Adjusting screw for clearance.  
Anchor sliding type.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—N. D. 7205.  
Throwout Bearing Type and No.—Nice 4703.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber bushed.

### STEERING GEAR

Type—Cam and lever.  
Adjustments—Column end-play—adjusting nut.  
Cross-shaft—adjusting screw.  
Lubricant—Fluid gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise, viewed from drive end.  
No. Load—67 amps., 5.5 volts, 4100 r.p.m.  
Lock Torque—12 ft. lbs., 550 amps., 3 volts.  
Brush Spring Tension—Not given.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—14.5-16.5 amps. at 6 volts, or 19-21 amps. at 8 volts.  
Output, hot—13-15 amps. at 7 volts.  
Brush Spring Tension—Not given.  
Rotation—Not given.  
Cutout to Close—7.0 volts.  
Amps. Discharge to Open—0.5.  
Field Fuse— $7\frac{1}{2}$  amps.

### IGNITION

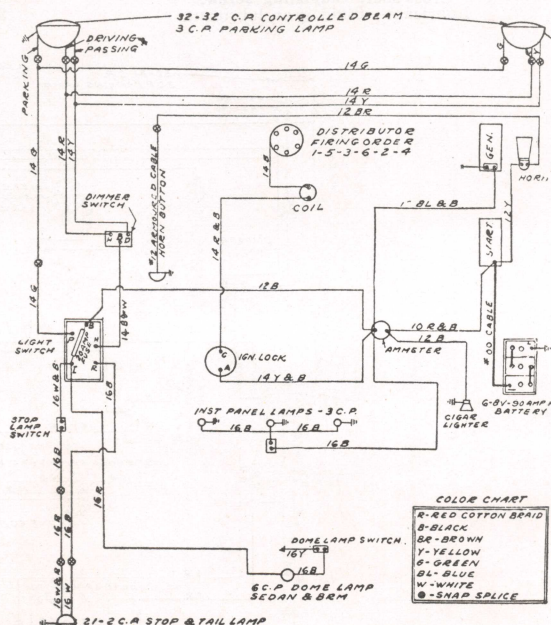
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise viewed from top.  
Breaker Gap—.018"-.020".  
Brush Spring Tension—Not given.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion 14 m/m.  
Manual Advance—None.  
Automatic Advance—Not given.  
Timing—3° before top dead center.  
Coil Amps., Engine Idling—Not given.  
Coil Amps., Engine Stopped—Not given.

### BATTERY

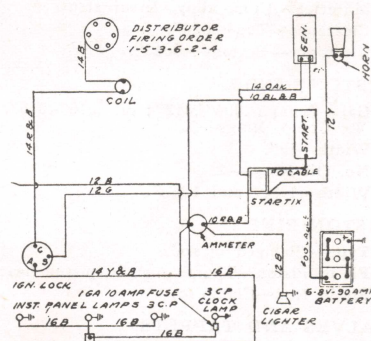
Amps.—90 amp. hr.

### LAMPS

Head—No. 1116.  
Park—No. 63.  
Instrument—No. 63 (3 required).  
Fuse—10 amps.  
Dome—No. 81.  
Stop and Tail—No. 1158 and No. 63.



WIRING DIAGRAM  
654 without Startix



654 with Startix



# Auburn 8, 1936

Model 852

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ ".  
Stroke— $4\frac{3}{4}$ ".  
Taxable H. P.—30.01.  
Displacement—280.0 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—115 at 3600 r.p.m.  
Supercharged—150 H. P. at 4000 r. p. m.

### CAMSHAFT

Drive—Chain.  
Chain Data—49 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—12 links, lower side of chain between punch marks.  
Bearings—6.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0025"-.0035".

### CONNECTING RODS

End Clearance—.004"-.009".  
Dia. Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—20 qts.  
Pump Drive—Belt.  
Belt Size—V-type, 46" x  $\frac{3}{4}$ ".  
Belt Adjustment—Fan pulley.  
Pump Pack Adj.—None.

### CRANKSHAFT

No. Bearings—5.  
Material—Bronze backed, babbitt lined.  
End Thrust Taken On—Center main bearing.  
End Clearance—.003"-.006".  
Dia. Clearance—.002"-.00325".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-1."  
Type—Downdraft dual.  
Adjustments—Idle—turn out to enrich;—in to lean mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—8 qts.  
Oil Pressure—35-40 lbs. at 40 m.p.h.  
Adjustment—None.  
Winter Oil—S.A.E. No. 20W.  
Summer Oil—S.A.E. No. 30.

### PISTONS

Material—Alum. alloy, Invar strut.  
Clearance—Top—.020".  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—Comp., .006"-.012"; oil, .010"-.018".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $1\frac{1}{8}$ " and  $1\frac{1}{16}$ ".

### PISTON PINS

Type—Clamped in rod.  
Fit in Piston—Thumb push fit, piston heated.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—.342".  
Seat Angle—Intake 30°; Exhaust 45°.  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006"-.008".  
Exhaust—.006"-.008".  
Guides Removable—Yes.  
Spring Pressure—Not given.

## CHASSIS

### FRONT AXLE

Caster— $3\frac{1}{2}$ ° min., 4° max.  
Camber— $1\frac{1}{2}$ °.  
Toe-in— $\frac{1}{8}$ "-. $\frac{3}{16}$ ".  
Kingpin Angle— $7\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lash—Not given.  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lubricant Capacity—Housing—4 pts.; dual ratio, 6 pts.

### TRANSMISSION

Make and Type—Detroit, synchro-mesh.  
Main Shaft Bearing Type and No.—N. D. 7509 and 7607.  
Countershaft Bearing Type and No.—Plain,  $\frac{1}{8}$ " x 1" x  $2\frac{1}{4}$ ".

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $24\frac{1}{2}$ " x 2" x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Anchor sliding type.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—N. D. 7205.  
Throwout Bearing Type and No.—Nice 5144.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber bushed.

### STEERING GEAR

Type—Cam and lever.  
Adjustments—Column end-play—adjusting nut.  
Cross-shaft—adjusting screw.  
Lubricant—Fluid gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise, viewed from drive end.  
No Load—50 amps., 1705 r.p.m.  
Lock Torque— $22\frac{1}{2}$  ft. lbs., 775 amps., 4 volts.  
Brush Spring Tension—Not given.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—19-21 amps. at 8 volts.  
Output, hot—13-15 amps. at 7 volts.  
Brush Spring Tension—Not given.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts.  
Amps. Discharge to Open—0.5.  
Field Fuse— $7\frac{1}{2}$  amps.

### IGNITION

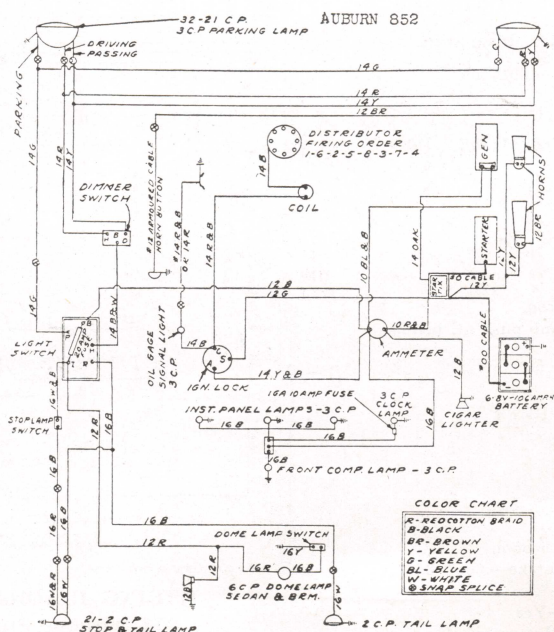
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise, viewed from top.  
Breaker Gap—.013"-.017".  
Brush Spring Tension—Not given.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion "J6" 14 m/m.  
Manual Advance—None.  
Automatic Advance—Not given.  
Timing—3° before top dead center.  
Coil Amps., Engine Idling—3.0.  
Coil Amps., Engine Stopped—4.5.

### BATTERY

Amps.—105 amp. hr.

### LAMPS

Head—No. 1116.  
Park—No. 63.  
Instrument—No. 63.  
Fuse—10 amps.  
Dome—No. 81.  
Stop and Tail—No. 1158 and No. 63.





# Auburn 653 and 851, 1935

## ENGINE

### DATA

No. of Cylinders—6-8.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{4}$ "  
Taxable H. P.—No. 653, 22.5;  
No. 851, 30.01.  
Displacement—No. 653, 210 cu. in.  
No. 851, 280 cu. in.  
Firing Order—1-5-3-6-2-4; 1-6-2-5-8-3-7-4.  
Maximum H. P.—85 at 3,500 r.p.m.;  
115 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain, non-adjustable.  
Chain Data—49 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—12 links lower side of chain  
between punch marks.  
Bearings—Six.  
End Thrust—Taken on front end.  
Bearing Clearance—.0025"-.0035".

### CONNECTING RODS

End Clearance—.004"-.009".  
Diameter Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—No. 653, 16 qts.; No. 851, 20 qts.  
Pump Drive—Belt.  
Belt Size—V-type, 46" long,  $\frac{3}{4}$ " wide.  
Belt Adjustment—Fan pulley.  
Pump Packing Adjustment—None.

### CRANKSHAFT

No. Bearings—No. 653, 4; No. 851, 5.  
Material—Bronze back, babbitt lined.  
End Thrust—Taken on:  
(6) Rear center main bearing.  
(8) Center main bearing.  
End Clearance—.003"-.006".  
Diameter Clearance—.002"-.00325".

### FUEL SYSTEM

Carburetor Make—(6) Carter  
Adjustment—(8) Stromberg  
No. 653—Idle  $\frac{1}{2}$ - $1\frac{1}{2}$ " turns open;  
High speed fixed.  
No. 851—Idle only; out, rich; in, lean.  
Fuel Delivery—Stewart-Warner pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—No. 653, 6 qts.; No. 851, 8 qts.  
Oil Pressure—35-40 lbs. at 40 m.p.h.  
Adjustment—None.  
Winter Oil—S. A. E. 20-W.  
Summer Oil—S. A. E. 30.

### PISTONS

Material—Aluminum alloy, Invar Strut.  
Clearance—Top, .020".  
Bottom, .0015".

### PISTON RINGS

Gap—Compression, .006"-.012".  
Oil, .010"-.018".  
No. Compression Rings—2.

Width— $\frac{1}{8}$ ".

No. Oil Rings—2.  
Width—One  $\frac{1}{8}$ "; one  $\frac{3}{16}$ ".

### PISTON PINS

Type—Clamps in rod.  
Fit in Piston—Thumb-push fit, piston heated.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Diameter Exhaust— $1\frac{1}{8}$ ".  
Diameter Intake— $1\frac{1}{8}$ ".  
Stem Diameter—.342".  
Seat Angle—Intake, 30°; exhaust, 45°.  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake, .006"-.008".  
Clearance—Hot: Exhaust, .006"-.008".  
Guides Removable—Yes.

## CHASSIS

### FRONT AXLE

Caster— $3\frac{1}{2}$ " minimum, 4° maximum.  
Camber— $1\frac{1}{2}$ ".  
Toe-in— $\frac{1}{8}$ "-. $\frac{1}{4}$ ".  
Kingpin Angle— $7\frac{1}{2}$ ".  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lash—Not given.  
Differential Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.005".  
Lubricant Capacity Housing—Not given.

### TRANSMISSION

Make and Type—No. 653, Warner;  
No. 851, Detroit.  
Main Shaft Bearing Type and No.:  
N. D. 7509 and 7607.  
Countershaft Bearing Type—Bronze.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Molded.  
Lining Size—No. 653,  $1\frac{1}{2}$ " x  $\frac{1}{8}$ ".  
No. 851, 2" x  $\frac{1}{8}$ ".  
Adjustments:  
Eccentric on shoe;  
Notched wheel adjusting screw.  
Clearance—Top, .010".  
Bottom, .010".  
Brake Effort—50/50.

### CLUTCH

Type—Single-plate.  
Facing Type—Molded.  
Pilot Bearing Type and No.—N. D. 7205.  
Throwout Bearing Type and No.—Nice 4703.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—None (rubber-bushed  
shackle).

### STEERING GEAR

Type—Ross.  
Adjustments:  
Nut top of column housing;  
Thread in housing cover.  
Lubricant—Fluid gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise, when viewed from top.  
No Load:  
No. 653—67 amps., 5.5 volts, 4100 r.p.m.  
No. 851—16 amps., 5.5 volts, 3100 r.p.m.  
Lock Torque:  
No. 653—12 ft. lbs., 550 amps., 3 volts.  
No. 851—22½ ft. lbs., 775 amps., 4 volts.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Output—Cold, 14.5-16.5 amps. at 6 volts,  
or 19-21 amps. at 8 volts.  
Hot, 13-15 amps., 7 volts.  
Rotation—Clockwise, viewing drive end.  
Field Fuse— $7\frac{1}{2}$  amps.

### IGNITION

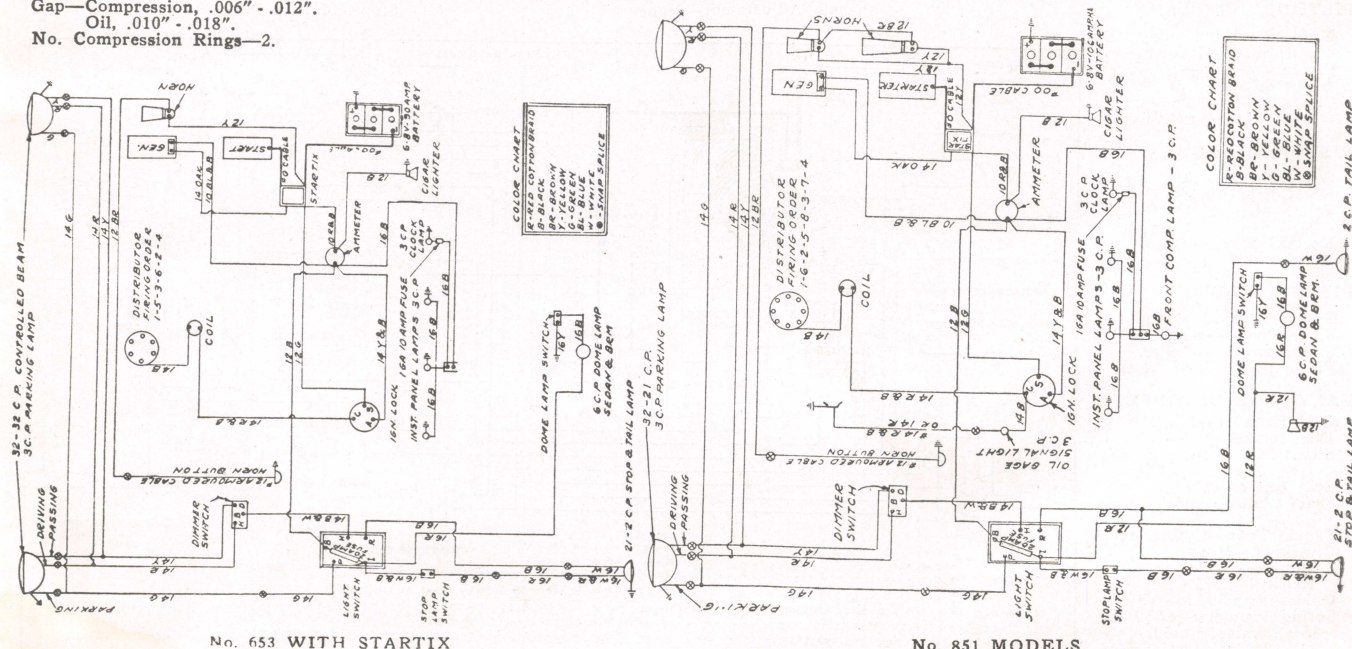
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distributor Rotation—Counter-clockwise,  
viewed from top.  
Breaker Gap—No. 653, .018"-.020".  
No. 851, .013"-.017".  
Spark Plug Gap—.025".  
Spark Plug Size—Champion J-6, 14 mm.  
Manual Advance—None.  
Timing—3° before top dead center on fly-  
wheel.

### BATTERY

Amps.—No. 653, 15-plate, 90 amp. hour.  
No. 851, 15-plate, 105 amp. hr.

### LAMPS

Head—Mazda, No. 1116.  
Park—Mazda, No. 63.  
Instrument—Mazda, No. 63 (3 required).  
Fuse—10 amps.  
Dome—Mazda, No. 81.  
Stop and Tail—Mazda, No. 1158 and No. 63.



No. 653 WITH STARTIX

No. 851 MODELS



**SERIES 38-60, 38-80, 38-90**

## DATA

No. Cylinders—8.  
Bore— $3\frac{7}{16}$ ".  
Stroke— $4\frac{5}{16}$ ".  
Taxable H. P.—37.81.  
Displacement—320.2 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—141 at 3600 r.p.m.

## CAMSHAFT

Drive—Chain.  
Chain Data—50 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line with  
copper-plated washers on chain 10 links  
apart.  
Bearings—5, replaceable.  
End Thrust Taken On—Thrust plate front  
end.  
End Clearance—.002"-.006".  
Bearing Clearance—.0005"-.0035".

## CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0008" min.-.0018" max.

## COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Fan belt.  
Belt Size—45° V, 29½" wide.  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Self-adjusting.

## CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Center main bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.0007" min.—.0022" max.

## FUEL SYSTEM

Carburetor Make—Stromberg AAV-2 or Marvel CD-2B.  
Type—Downdraft dual.  
Adjustment—Stromberg: idle, 1 turn open. Marvel: idle,  $\frac{3}{4}$  turn open.  
Fuel Delivery—A. C. camshaft pump.

## LUBRICATION

Type—Pressure.  
 Pump Type—Helical gear.  
 Capacity—9 qts.; refill 8 qts.  
 Oil Pressure—45 lbs. normal operation.  
 Adjustment—Non-adjustable.

Oil { Not lower than 32° F. S.A.E. 20W. or 20  
 { As low as 10° above S.A.E. 20W.  
 { As low as 10° below S.A.E. 10W.  
 { Below 10° below zero S.A.E. 10W.  
 { plus 10% kerosene.

## PISTONS

Material—Alum. alloy, T  
slot, anodized finish.  
Clearance—Top—  
Not given.  
Clearance—Bottom—  
.0017"-.0023" selective.

## PISTON RINGS

Gap—All rings .010"-.015".  
No. Comp. Rings—2.  
Width—Upper  $\frac{1}{8}$ "; No. 2,  
 $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

## PISTON PINS

Type—Clamped in rod.  
Fit in Piston—.0003".0004"  
selective at 70° F.  
Fit in Rod—Clamp fit.

## VALVES AND TAPPETS

Dia. Exhaust—1 $\frac{7}{16}$ ".  
Dia. Intake—1 $\frac{29}{32}$ ".  
Stem Dia.—Int. .3715";  
Exh. .3711".  
Seat Angle—45°.  
Seat Width—.062" nominal.  
Tappet Type—Cylindrical.  
Clearance—Hot:  
Intake—.015".  
Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—42-52 lbs.  
total, valve closed.  
112-124 lbs. total, valve  
open.

### FRONT AXLE

Caster—Reverse  $7\frac{1}{8}^{\circ} + 3\frac{1}{8}^{\circ}$ .  
Camber— $-1\frac{1}{4}^{\circ}$ .  
Toe-in— $0''-1\frac{1}{16}''$ .  
Kingpin Angle—Series 60,  $3\frac{1}{2}^{\circ}$ - $4\frac{1}{2}^{\circ}$ ; Series 80,  $4\frac{1}{4}^{\circ}$ - $5\frac{1}{4}^{\circ}$ ; Series 90,  $4^{\circ}$ - $5^{\circ}$ .  
Tie Rod—Adj.—Thread.

## REAR AXLE

Type—Semi-floating hypoid.  
 Series 60, Hyatt roller No. 125630 and  
 N. D. double row ball No. 905126.  
 Series 80 and 90, Hyatt roller No. 126047  
 and N. D. double row ball No. 905307.  
 Adjustment—Shims.  
 End Play—Not given.  
 Lash—.006"/.010".  
 Diff. Bearing Type—Hyatt roller, Series 60  
 No. KA-1145Z; Series 80 and 90, No.  
 149523.  
 Adjustment—Thread.  
 End Play—Not given.  
 Lubricant Capacity—Housing—Series 60, 3  
 pts.; Series 80 and 90, 4 pts.

## TRANSMISSION

Make and Type.—Own, helical gear, 3-speed.  
Main Shaft Bearing Type and No.—N. D.  
No. 47507 and No. 43306.  
Countershaft Bearing Type and No.—Needle  
bearings.

## BRAKES

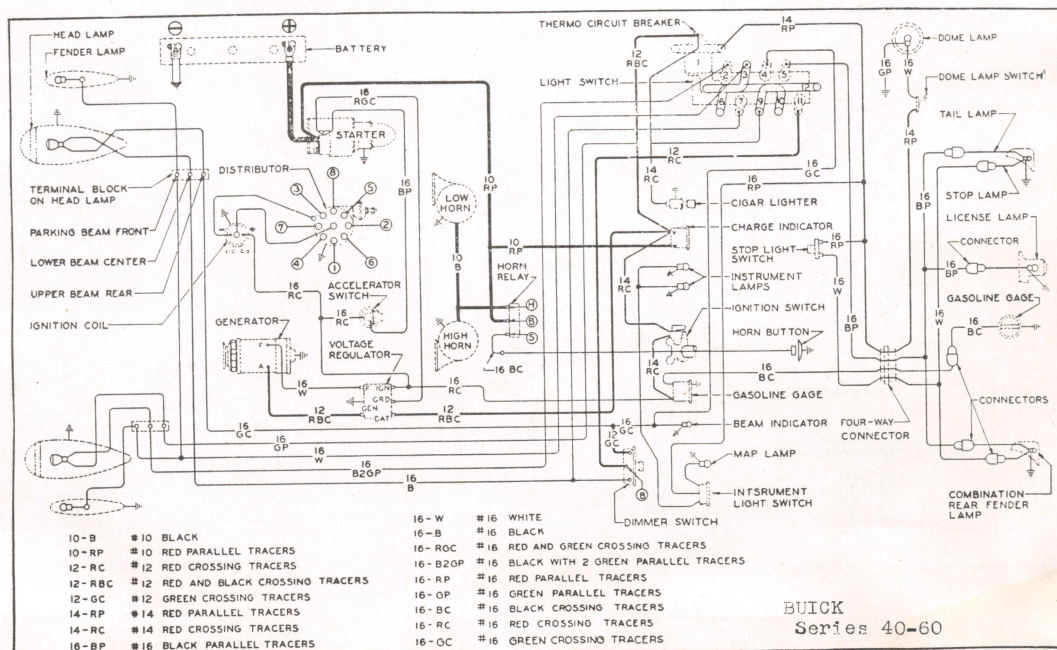
Type—Bendix hydraulic.  
Lining Type—Primary woven; secondary moulded.  
Lining Size—Series 60 and 80, Primary shoe  $9\frac{1}{16}" \times 2" \times \frac{3}{16}"$ ; Secondary shoe  $12\frac{3}{4}" \times 2" \times \frac{3}{16}"$ ; Series 90, Primary shoe  $12\frac{1}{16}" \times 2" \times \frac{1}{4}"$ ; Secondary shoe  $14\frac{3}{4}" \times 2" \times \frac{1}{4}"$ .  
Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—Series 60 and 80, 53% front, 47% rear; Series 90, 52.6% front, 47.4% rear.

## CLUTCH

Type—Plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No.  
7109.  
Throat Bearing Type and No.—Bearings  
Co. No. 4768A.

## SPRINGS

Type Front—Coil.  
Type Rear—Coil.  
Shackle Adjustment—None.





# Buick, 1938

SERIES 38-40

## ENGINE

### DATA

No. of Cylinders—8.  
Bore—3 $\frac{3}{8}$ ".  
Stroke—4 $\frac{1}{8}$ ".  
Taxable H. P.—30.63.  
Displacement—248.0 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—107 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—49 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line with copper-plated washers on chain 10 links apart.  
Bearings—5, replaceable.  
End Thrust Taken On—Thrust plate front end.  
End Clearance—.002"-.006".  
Bearing Clearance—.0005"-.0035".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0008" min.; .0018" max.

### COOLING SYSTEM

Capacity—13 $\frac{1}{4}$  qts.  
Pump Drive—Fan belt.  
Belt Size—45" V, 2 $\frac{3}{8}$ " wide.  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj—Self-adjusting.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed babbit.  
End Thrust Taken On—Center main bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.0007" min.; .0022" max.

### FUEL SYSTEM

Carburetor Make—Stromberg AAV-1 or Marvel CD-1B.  
Type—Downdraft dual.  
Adjustment—Stromberg: Idle, 1 turn open.  
Marvel: Idle, 1 turn open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Helical gear.  
Capacity—7 qts., 6 qts. refill.  
Oil Pressure—45 lbs. normal operation.  
Adjustment—Non-adjustable.  
Oil { Not lower than 32° F.S.A.E. 20W. or 20  
As low as 10° above.S.A.E. 20W.  
As low as 10° below.S.A.E. 10W.  
Below 10° below zero.S.A.E. 10W.  
plus 10% kerosene.

### PISTONS

Material—Alum. alloy, T-slot, anodized finish.  
Clearance—Top—Not given.  
Clearance—Bottom—.0015"-.0021" selective.

### PISTON RINGS

Gap—Comp. .010"-.015";  
Oil. .010"-.015".  
No. Comp. Rings—2.  
Width—Upper,  $\frac{1}{8}$ "; No. 2,  $\frac{3}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Clamped rod.  
Fit in Piston—.0003".  
.0004" selective at 70° F.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust—1 $\frac{1}{16}$ ".  
Dia. Intake—1 $\frac{1}{16}$ ".  
Stem Dia.—Int., .3715";  
Exh., .3711".  
Seat Angle—45°.  
Seat Width—.062" nominal.  
Tappet Type—Cylindrical.  
Clearance—Hot:  
Intake—.015".  
Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—42-52 lbs. total, valve closed.  
112-124 lbs. total, valve open.

## CHASSIS

### FRONT AXLE

Caster—Reverse  $\frac{7}{8}$ " +  $\frac{3}{8}$ ".  
Camber— $-\frac{1}{4}$ "-1".  
Toe-in—0"- $\frac{1}{16}$ ".  
Kingpin Angle—3 $\frac{1}{2}$ "-4 $\frac{1}{2}$ ".  
Tie Rod—Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Hyatt roller No. 125630 and N. D. double row ball No. 905126.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.006"-.010".  
Diff. Bearing Type—Hyatt Roller No. KA-1145Z.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, helical gear, 3-speed.  
Main Shaft Bearing Type and No.—N. D. Ball No. 47507 and 3206.  
Countershaft Bearing Type and No.—Bronze bushings.

### BRAKES

Type—Bendix, hydraulic.  
Lining Type—Primary, woven; secondary, moulded.  
Lining Shoe—Primary shoe, 9 $\frac{15}{16}$ " x 1 $\frac{3}{4}$ " x  $\frac{3}{16}$ "; Secondary shoe, 12 $\frac{3}{4}$ " x 1 $\frac{3}{4}$ " x  $\frac{9}{16}$ ".  
Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—53% front; 47% rear.

### CLUTCH

Type—Plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Hyatt No. 836713.  
Throwout Bearing Type and No.—Bearings Co. No. 4768A.

### SPRINGS

Type Front—Coil.  
Type Rear—Coil.  
Shackle Adjustment—None.

### STEERING GEAR

Type—Saginaw worm and double-tooth roller.  
Adjustments—Column end play—adjusting screw at bottom.  
Cross-shaft end play—adjusting screw.  
Mesh or lash—adjuster at bottom.  
Lubricant— $\frac{3}{4}$  pt. or lb. all season steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 734-21.  
Drive—Solenoid shifted pinion.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 575 amps., 3.4 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy No. 1101052.  
Drive—Fan belt.  
Regulation—Compensated 3rd brush and voltage regulator.  
Thermostat—None.  
Output, cold—28-31 amps. at 8 volts.  
Output, hot—25-28 amps. at 8 volts.  
Brush Spring Tension—Not given.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.4 to 7 volts cold.  
Amps. Discharge to Open—0-3.5 discharge.  
Field Fuse—Not given.

### IGNITION

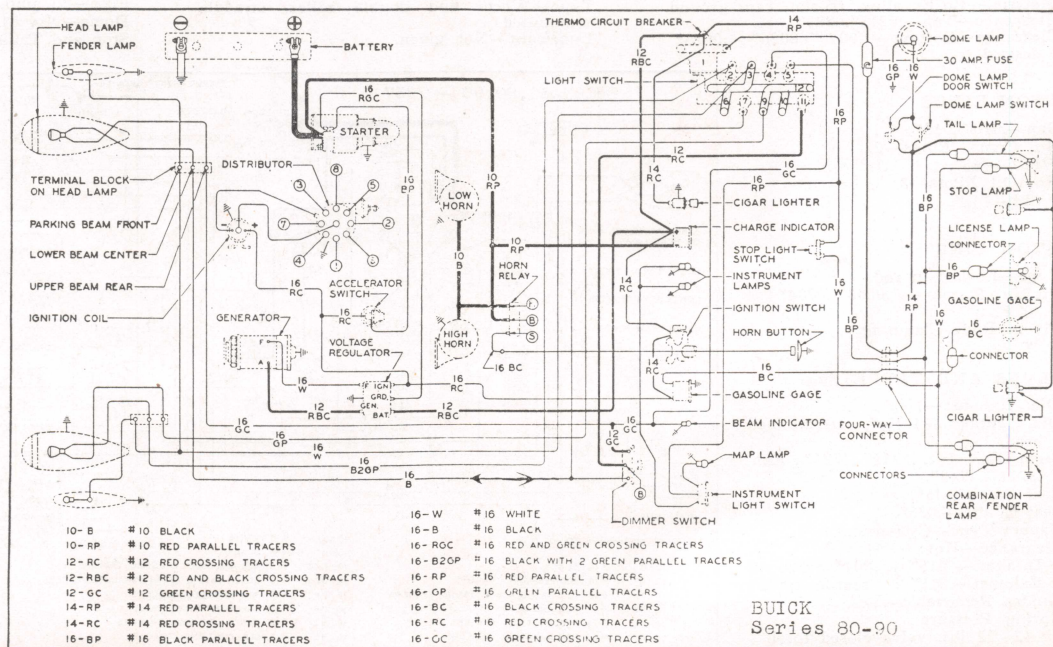
Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.023"-.028".  
Spark Plug Size—14 m/m. A. C. No. 46.  
Manual Advance—Not given.  
Automatic Advance—22°-26° at 3000 r.p.m.  
Vacuum Advance—12°.  
Timing—4 degs. before top dead center advanced.  
Coil Amps., Engine Idling—2 $\frac{1}{2}$ ".  
Coil Amps., Engine Stopped—4 $\frac{1}{2}$ ".

### BATTERY

Amps.—Delco 110 amp. hour.

### LAMPS

Head—No. 2320L.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—30 amps.  
Dome—No. 81L.  
Stop and Tail—No. 1154.



BUICK  
Series 80-90



# Buick, 1937

SERIES 60, 80, 90\*

\* All specifications apply to the 60 "Century," 80 "Roadmaster" and 90 "Limited" unless special mention is made.

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{1}{16}$ "  
Taxable H. P.—37.81.  
Displacement—320.2 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—130 at 3400 r.p.m.

### CAMSHAFT

Drive—Link-belt chain.  
Chain Data—50 links,  $1\frac{1}{4}$ " wide,  $1\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line with copper-plated washers on chain.  
Bearings—5, steel backed, babbit lined.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—.0005"-.0035".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0008"-.0018".

### COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Belt.  
Belt Size—45" V,  $45\frac{1}{16}$ " inside x  $2\frac{9}{32}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Self-adjusting.

### CRANKSHAFT

No. Bearings—8.  
Material—Steel-backed babbit.  
End Thrust Taken On—Center.  
End Clearance—.004"-.007".  
Dia. Clearance—.0007"-.0022".

### FUEL SYSTEM

Carburetor Make—Stromberg "AA2."  
Type—Dual downdraft.  
Adjustment—Turn needle out for rich mixture. Turn needle in for lean mixture.  
Fuel Delivery—A. C. pump type "AB."

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—Dry, 9 qts; refill, 8 qts.  
Oil Pressure—45 lbs. at 35 m.p.h.  
Adjustment—Non-adjustable.  
Oil {  
120°-50°.....S.A.E. 30  
80°-30°.....S.A.E. 20  
80°-10°.....S.A.E. 20W.  
45° minus 10° ..S.A.E. 10W.  
20° minus 20° ..S.A.E. 10W, + 10%  
kerosene.

### PISTONS

Material—Lo-Ex alloy, tri-slot, cam ground.  
Clearance—Top—.0215"-.0285".  
Clearance—Bottom—.0020"-.0026"; .0023" desired.

### PISTON RINGS

Gap—.010"-.015".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0003"-.0004" at 70°F.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{1}{8}$ ", streamlined head.  
Stem Dia.—Int. .3715"-.3725"; Exh. .3711"-.3719".  
Seat Angle—45°.  
Seat Width—.075".  
Tappet Type—Cylindrical.  
Clearance—Hot:  
Intake—.015" { .004" valve off  
Exhaust—.015" { seat for timing  
Guides Removable—Yes.  
Spring Pressure  
42-52 lbs. valve closed total.  
112-124 lbs. valve open total.

## CHASSIS

### FRONT AXLE

Caster—"60"— $\frac{1}{8}$ "—+  $\frac{5}{8}$ ".  
"80", "90"— $\frac{3}{8}$ "—+  $\frac{3}{8}$ ".  
Camber—"60"— $\frac{1}{4}$ "—+ 1".  
Toe-in—"60"— $\frac{1}{16}$ ".  
Kingpin Angle—"60"— $3\frac{1}{2}$ "- $4\frac{1}{2}$ ".  
"80"— $4\frac{1}{4}$ "- $5\frac{1}{4}$ "; "90"—4°-5°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—"60"—Semi-floating hypoid.  
"80", "90"—Semi-floating, spiral bevel.  
Pinion Bearing Type—"60"—N. D. No. 905126 and Hyatt No. 125630.  
"80", "90"—N. D. No. 905307 and Hyatt No. 126047.  
Bearing Adjustment—None; pinion adjustment, shims.  
End Play—Not given.  
Lash—.008"-.010".  
Diff. Bearing Type—"60"—N. D. Difrax No. 902113; "80", "90", N. D. Difrax No. 902110.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—"60"—3 lbs.; "80", "90", 4 lbs.

### TRANSMISSION

Make and Type—Own, helical gears.  
Main Shaft Bearing Type and No.—N. D. 954144 and 954120.  
Countershaft Bearing Type and No.—Bantam needle bearing No. 1298445.

### BRAKES

Type—Hydraulic.  
Lining Type—Hard compressed woven.  
Lining Size—"60"— $22\frac{1}{16}$ " x 2" x  $\frac{3}{16}$ ".  
"80"— $22\frac{1}{16}$ " x 2" x  $\frac{3}{16}$ ".  
"90"— $26\frac{1}{16}$ " x 2" x  $\frac{1}{4}$ ".  
Clearance—Top—.010" + .002".  
Bottom—.010" + .002".  
Brake Effort—"60"—53% front; 47% rear.  
"80", "90", 52.4% front; 47.6% rear.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. No. 907109.  
Throwout Bearing Type and No.—N. D. No. 954175.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded type.

### STEERING GEAR

Type—Worm and double roller, straddle mounted.  
Lubricant—Not given.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 727W.  
Drive—Over-running clutch.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3 volts.  
Brush Spring Tension—24-28oz.

### GENERATOR

Make—Delco-Remy 918A.  
Drive—V-belt.  
Regulation—3rd brush and voltage regulator.  
Thermostat—None.  
Output, cold—28-30 amps., 8 volts, 4000 r.p.m.  
Output, hot—25-28 amps., 8 volts, 4000 r.p.m., or 46.5 m.p.h.  
Brush Spring Tension—24-28 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.4-7.0 volts at 800 r.p.m., or 9.1 m.p.h.  
Amps. Discharge to Open—0-3½.  
Field Fuse—None.

### IGNITION

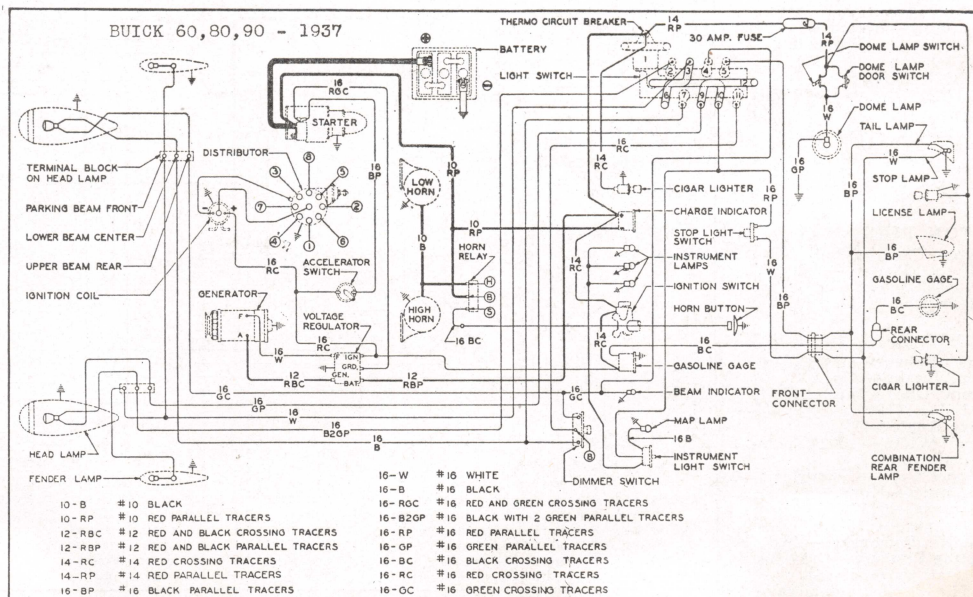
Distributor—Delco-Remy 663Z.  
Coil—Delco-Remy.  
Distr. Rotation—Clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.022"-.027".  
Spark Plug Size—A. C. "H-9"—18 m/m.  
Manual Advance—20°.  
Automatic Advance—12°-16°.  
Vacuum Advance—12°.  
Timing—10° before top dead center, control in mid-position.  
Coil Amps., Engine Idling—2½.  
Coil Amps., Engine Stopped—4½.

### BATTERY

Amps.—Delco—120 amp. hr.

### LAMPS

Head—2320L.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—30 amp. and Thermo circuit breaker.  
Dome—No. 81L.  
Stop and Tail—No. 1154.





# Buick, 1937

## SERIES 40

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{3}{32}$ ".  
Stroke— $4\frac{1}{8}$ ".  
Taxable H. P.—30.63.  
Displacement—248 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—100 at 3200 r.p.m.

#### CAMSHAFT

Drive—Link belt chain.  
Chain Data—49 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line with copper-plated washers on chain.  
Bearings—5, steel backed, babbitt lined.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—.0005"-.0035".

#### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0008"-.0018".

#### COOLING SYSTEM

Capacity—13 $\frac{1}{4}$  qts.  
Pump Drive—Belt.  
Belt Size—45° V— $42\frac{1}{16}$ " inside,  $25\frac{3}{32}$ " wide.  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Self-adjusting.

#### CRANKSHAFT

No. Bearings—8.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Center bearing.  
End Clearance—.004"-.007".  
Dia. Clearance—.0007"-.0022".

#### FUEL SYSTEM

Carburetor Make—Stromberg "AA1."  
Type—Dual downdraft.  
Adjustment—Turn needle out for rich mixture. Turn needle in for lean mixture.  
Fuel Delivery—A. C. mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—Dry, 7 qts.; refill, 6 qts.  
Oil Pressure—45 lbs. at 35 m.p.h.  
Adjustment—Non-adjustable.

Oil { 120°-50° ..... S.A.E. 30  
80°-30° ..... S.A.E. 20  
80°-10° ..... S.A.E. 20W.  
45°-10° ..... S.A.E. 10W.  
20°-20° ..... S.A.E. 10W. + 10% kerosene.

#### PISTONS

Material—Lo-Ex alloy, tri-slot, cam ground.  
Clearance—Top—.018"-.024".  
Clearance—Bottom—.0018"-.0024", .0021 desired.

#### PISTON RINGS

Gap—.010"-.015".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0003"-.0004" at 70°F.  
Fit in Rod—Clamp fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{11}{32}$ ".  
Dia. Intake— $1\frac{17}{32}$ ".  
Stem Dia.—Int. .3715"-.3725"; Exh. .3711"-.3719".  
Seat Angle—45°.  
Seat Width—.075".  
Tappet Type—Cylindrical.  
Clearance—Hot:  
Intake—.015" { Valve .004" off  
Exhaust—.015" { seat for timing  
Guides Removable—Yes.  
Spring Pressure  
42-52 lbs. valve closed total  
112-124 lbs. valve open total.

### CHASSIS

#### FRONT AXLE

Caster— $-\frac{1}{8}^{\circ}$ — $+\frac{5}{8}^{\circ}$ .  
Camber— $-\frac{1}{4}^{\circ}$ — $+\frac{1}{2}^{\circ}$ .  
Toe-in— $0^{\circ}$ - $\frac{3}{16}$ ".  
Kingpin Angle— $3\frac{1}{2}^{\circ}$ - $4\frac{1}{2}^{\circ}$ .  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid gears.  
Pinion Bearing Type—N. D. No. 905126 and Hyatt 125630.  
Bearing Adjustment—None; Pinion adjustment—shims.  
End Play—Not given.  
Lash—.008"-.010".  
Diff Bearing Type—N. D. Difrax No. 902113.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 lbs.

#### TRANSMISSION

Make and Type—Own—all helical gears.  
Main Shaft Bearing Type and No.—N. D. No. 954144 and 903206.  
Countershaft Bearing Type and No.—Hard pressed brass,  $\frac{7}{8}$ " x 1" x 2".

#### BRAKES

Type—Hydraulic.  
Lining Type—Hard compressed woven.  
Lining Size— $22\frac{1}{16}$ " x  $1\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Anchor adjustment—sliding type.  
Clearance  
Top—.010" + .002".  
Bottom—.010" + .002".  
Brake Effort—53% front; 47% rear.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. 907109.  
Thrustout Bearing Type and No.—N. D. No. 954175.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded.

#### STEERING GEAR

Type—Worm and double roller, straddle mounted.  
Adjustments—Column end play, adjusting screw in bottom cover.  
Cross-shaft end play, adjusting screw side cover. Mesh—eccentric sleeve.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Delco-Remy 734Z.  
Drive—Over-running clutch.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps, 5 volts at 5000 r.p.m.  
Lock Torque—12 ft. lbs., 575 amps., 3.4 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Delco-Remy 918B.  
Drive—V-belt.  
Regulation—3rd brush and voltage regulator.  
Thermostat—None.  
Output, cold—28-30 amps., 8 volts, 4000 r.p.m.  
Output, hot—25-28 amps., 8 volts, 4000 r.p.m.  
Brush Spring Tension—24-28 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.4-7.0 volts at 800 r.p.m. hot, or 8.1 m.p.h. approximate.  
Amps. Discharge to Open—3 $\frac{1}{2}$  amps.  
Field Fuse—None.

#### IGNITION

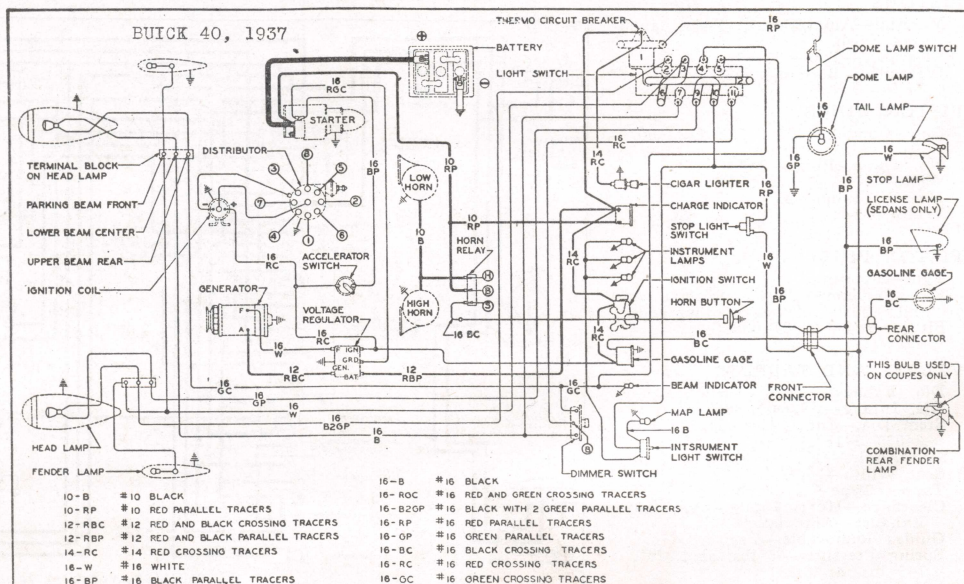
Distributor—Delco-Remy 663Y.  
Coil—Delco-Remy.  
Distr. Rotation—Clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.022"-.027".  
Spark Plug Size—A. C. 18 m/m "H-9."  
Manual Advance—20°.  
Automatic Advance—22°-26°.  
Vacuum Advance—12°.  
Timing—2° before top dead center control, lever in mid position.  
Coil Amps., Engine Idling—2 $\frac{1}{2}$ .  
Coil Amps., Engine Stopped—4 $\frac{1}{2}$ .

#### BATTERY

Amps.—Delco—100 amp. hr.

#### LAMPS

Head—No. 2320L.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—None—Thermo circuit breaker.  
Dome—No. 81L.  
Stop and Tail—No. 1154.





# Cadillac V-8, 1938

SERIES 38-60, 38-60S, 38-65, 38-75

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{2}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—39.20.  
Displacement—346.0 cu. in.  
Firing Order—1-8-7-3-6-5-4-2.  
Front—2-4-6-8-1-3-5-7.  
Max. H. P.—60-60S-65, 135 at 3400 r.p.m.  
75, 140 at 3400 r.p.m.

### CAMSHAFT

Drive—Morse Type C, No. 3682R.  
Chain Data—62 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks in alignment opposite each other.  
Bearings—Not given.  
End Thrust Taken On—Front end.  
.0025"-.0037".  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.003"-.006".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity—60-60S, 6 gals.; 65-75,  $6\frac{1}{4}$  gals.  
Pump Drive—Vee belt.  
Belt Size—Vee,  $1\frac{1}{4}$ " wide x  $41\frac{1}{4}$ " long.  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze or steel-backed babbit.  
End Thrust Taken On—Center No. 2 bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.0015".

### FUEL SYSTEM

Carburetor Make—Stromberg AA-V-25.  
Type— $1\frac{1}{4}$ " downdraft, dual.  
Adjustment—Idle, turn in to lean; out to rich.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Helical gear.  
Capacity—7 qts.  
Oil Pressure—25 lbs. at 30 m.p.h.  
Adjustment—None.  
Winter Oil—0°-32° 20W; below zero 10W.  
Summer Oil—Moderate speeds, 30; high speeds, 40-50.

### PISTONS

Material—Alum. alloy, T-slot, anodized finish.  
Clearance—Top—.0196".  
Clearance—Bottom—.0021".

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{3}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0004", press fit one end; .0000" clearance other end.  
Fit in Rod—.0002"-.0008".

### VALVES AND TAPPETS

Dia. Exhaust— $1.626$ "-. $1.636$ ".  
Dia. Intake— $1.876$ "-. $1.886$ ".  
Stem Dia.—Int., .3415"-.3425"; Exh., .3405"-.3415".  
Seat Angle— $45^\circ$ .  
Seat Width— $\frac{5}{16}$ ".  
Tappet Type—Hydraulic.  
Clearance—Hot: Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—66 lbs. at 1.926".  
145 lbs. at 1.581".  
Free length 2.210".

## CHASSIS

### FRONT AXLE

Caster—60, 60S,  $3\frac{1}{4}$ °-0°; 65 and 75, 0°+ $\frac{1}{4}$ °.  
Camber—60, 60S,  $\frac{1}{4}$ °-1°; 65 and 75, 0°- $\frac{1}{2}$ °.  
Toe-in—Car in motion, 0°- $\frac{1}{16}$ °; at rest,  $\frac{1}{32}$ °.  
Kingpin Angle—60, 60S, 4°-51'; 65 and 75, 5°-38'.  
Tie Rod Adj.—Threaded.

### REAR AXLE

Type—Own, semi-floating, hypoid.  
Pinion Bearing Type—60, 160S, Timken, No. 1422450 and No. 1422451; 65 and 75, Timken No. 1426641 and No. 1423389.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken 60, 60S, No. 1419354; 65 and 75, Timken No. 1423548.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—60, 60S, 5 pts.; 65 and 75, 6 pts.

### TRANSMISSION

Make and Type—Own, 3-speed, helical gears.  
Main Shaft Bearing Type and No.—N. D. Ball No. 47508 and 47508-7.  
Countershaft Bearing Type and No.—Needle bearing.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—60, 60S,  $25\frac{3}{8}$ " x  $2\frac{1}{4}$ " x  $\frac{3}{16}$ "; 65,  $25\frac{3}{8}$ " x  $2\frac{1}{4}$ " x  $\frac{3}{16}$ "; 75,  $27\frac{1}{4}$ " x  $2\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—60, 6S and 75, 54½% rear; 75, 57% front, 43% rear.

### CLUTCH

Type—Long, semi-centrifugal.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No. 7502.  
Throwout Bearing Type and No.—Bearings Co. C.T.D.S No. 56.

### SPRINGS

Type Front—Helical (coil).  
Type Rear—Semi-elliptic.  
Shackle Adjustment—60, 60S, thread; 65 and 75, thread and rubber.

### STEERING GEAR

Type—Saginaw worm and double tooth roller.  
Adjustments—Column end play—adj. screw.  
Cross-shaft adj. screw mesh—eccentric.  
Lubricant—Not given.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy—727V.  
Drive—Solenoid shifted gear.  
Rotation—Clockwise, viewing pinion.  
No. Load—65 amps., 5 volts, 5500 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy, 60, 60S, No. 1101051.  
Delco-Remy, 65, No. 1101054.  
Delco-Remy, 75, No. 1102652.  
Drive— $\frac{3}{4}$ " Vee belt,  $47\frac{1}{16}$ " long.  
Regulation—60, 60S, 65, voltage regulation; 75, voltage and current regulation.  
Thermostat—None.  
Max. charge rate 26 amps., max. ser., 75, 28-30 amps., max. series 60, 60S, 75.  
Due to voltage regulation actual charging rate is controlled by state of charge of battery.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—60, 60S, 65, 6.5-7 volts; 75, 6.8-7 volts.  
Amps. Discharge to Open—60, 60S, 65, 0-3; 75, 0-2.  
Field Fuse—None.

### IGNITION

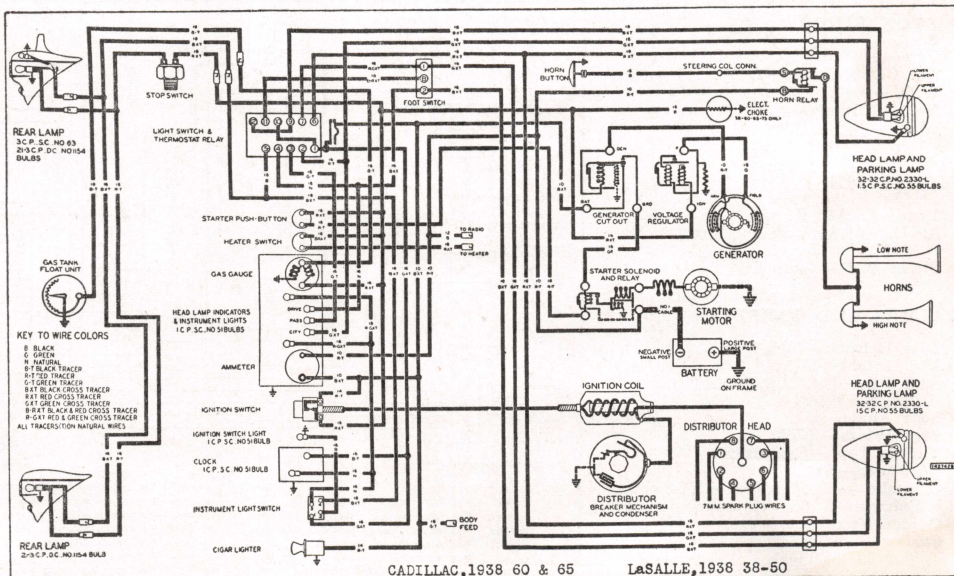
Distributor—Delco-Remy—665G.  
Coil—Delco-Remy—539C.  
Distr. Rotation—Clockwise.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025"-.030".  
Spark Plug Size—14 m/, A. C. No. 45.  
Manual Advance—20°.  
Automatic Advance—22°.  
Vacuum Advance—None.  
Timing—5 degs. before top dead center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—60, 60S, 65, 110 amp. hr.; 75, 130 amp. hr.

### LAMPS

Head—No. 2330-L.  
Park—No. 55 in headlamps.  
Instrument and Indicators—No. 51.  
Fuse—Not given.  
Dome—No. 81.  
Stop and Tail—No. 1154 and No. 63.





# Cadillac V-16, 1938

SERIES 38-90

## ENGINE

### DATA

No. of Cylinders—16 (135° V.).  
Bore— $3\frac{1}{4}$ ".  
Stroke— $3\frac{1}{4}$ ".  
Taxable H. P.—67.60.  
Displacement—431.0 cu. in.  
Firing Order—1-4-9-12-3-16-11-8-15-14-7-6-13-2-5-10.  
Front—2-4-6-8-10-12-14-16-1-3-5-7-9-11-13-15.  
Max. H. P.—185 at 3600 r.p.m.

### CAMSHAFT

Drive—Morse, Type C, No. 3682R.  
Chain Data—62 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks directly opposite each other.  
Bearings—5.  
End Thrust Taken On—Front end.  
Bearing Clearance—.002"-.003".

### CONNECTING RODS

End Clearance—.0045"-.0075".  
Dia. Clearance—.0010"-.0025".

### COOLING SYSTEM

Capacity— $7\frac{1}{2}$  gals.  
Pump Drive—Two Vee belts (two pumps).  
Belt Size—V,  $49\frac{5}{8}$ " x  $5\frac{1}{2}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—9.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Center No. 5 bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.0015".

### FUEL SYSTEM

Carburetor Make—(2) Carter, L. H., 407S; R. H., 408S.  
Type— $1\frac{1}{8}$ ", downdraft dual.  
Adjustment—Idle adjustment,  $\frac{1}{4}$  to 1 turn open.  
Fuel Delivery—Two A. C. camshaft pumps.

### LUBRICATION

Type—Pressure.  
Pump Type—Helical gear.  
Capacity—11 qts.  
Oil Pressure—25 lbs. at 30 m.p.h.  
Adjustment—None.  
Winter Oil—0°-32°, 20W; below zero, 10W.  
Summer Oil—Moderate speeds, 30; high speed, 40-50.

### PISTONS

Material—Alum. alloy, T-slot, anodized finish.  
Clearance—Top—.0196".  
Clearance—Bottom—.0015"-.002".

### PISTON RINGS

Gap—.007"-.015", all rings.  
No. Comp. Rings—2.  
Width—One  $\frac{1}{8}$ ", one  $\frac{3}{32}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.00035" clearance.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust—1.370"-1.380".  
Dia. Intake—1.495"-1.505".  
Stem Dia.—Int., .3415 -.3425 ; Exh., .3405"-.3415".  
Seat Angle—45°.  
Seat Width— $\frac{5}{16}$ ".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—49 lbs. at 1.8125" ( $1\frac{13}{16}$ ").  
95½ lbs. at 1.5225". Free length 2.130".

## CHASSIS

### FRONT AXLE

Caster—0° + or -  $\frac{1}{4}$ ".  
Camber—0°- $\frac{1}{2}$ ".  
Toe-in—Car in motion, 0"- $\frac{1}{16}$ "; at rest,  $\frac{1}{32}$ "- $\frac{3}{32}$ ".  
Kingpin Angle—5° 38'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Timken No. 1426441 and No. 1423389.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken No. 1423548.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Own, 3-speed, helical gear.  
Main Shaft Bearing Type and No.—N. D.  
Ball No. 47508 and No. 47508-7.  
Countershaft Bearing Type and No.—Needle bearing.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $12\frac{15}{16}$ " x  $2\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—57% front; 43% rear.

### CLUTCH

Type—Long.  
Facing Type—Woven.  
Bilot Bearing Type and No.—N. D. Ball No. 7502.  
Throwout Bearing Type and No.—N. D.  
Ball No. C. T.-34.

### SPRINGS

Type Front—Helical (coil).  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread and rubber.

### STEERING GEAR

Type—Saginaw worm and double tooth roller.  
Adjustments  
Column end play—adjusting screw.  
Cross-shaft—adjusting screw.  
Mesh—eccentric.  
Lubricant—Special steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 000714 (6 pole).  
Drive—Solenoid shifted gear.  
Rotation—Not given.  
No Load—65 amps., 5.0 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.63 volts.  
Brush Spring Tension—Not given.

### GENERATOR

Make—Delco-Remy No. 1102651.  
Drive—Friction drive from fan pulley.  
Regulation—Current and voltage regulation.  
Thermostat—None.  
Output—26 amps. max. charge rate. Due to voltage regulation actual charging rate is controlled by state of charge of battery.  
Brush Spring Tension—Not given.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.8 to 7.3 volts.  
Amps. Discharge to Open—0-2.  
Field Fuse—None.

### IGNITION

Distributor—(2) Delco-Remy No. 1110601  
L. H. and 1110602 R. H.  
Coil—Delco-Remy 553E (two).  
Distr. Rotation—Not given.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.032".  
Spark Plug Size—14 m/m A.C. No. 45 (blue top).  
Manual Advance—20°.  
Automatic Advance—28°.  
Vacuum Advance—None.  
Timing—6 degs. before top dead center.  
"IGA" mark on harmonic balancer.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—Delco, 164 amp. hr.

### LAMPS

Head—No. 2330L.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—Not given.  
Dome—Not given.  
Stop and Tail—No. 1154 and No. 63.



# Cadillac V-8 1937

SERIES 60, 65, 70 & 75

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{2}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—39.20.  
Displacement—346.0 cu. in.  
Firing Order—1-8-7-3-6-5-4-2.  
Max. H. P.—135 at 3400 r.p.m.

### CAMSHAFT

Drive—Morse 3862-RX chain.  
Chain Data—62 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to flywheel marking.  
Bearings—4.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0025"-.0037".

### CONNECTING RODS

End Clearance—.003"-.006".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity— $6\frac{1}{4}$  gals.  
Pump Drive—Belt.  
Belt Size—34" V.  
Belt Adjustment— $11\frac{1}{2}$ " C to C x  $1\frac{1}{64}$ ".  
Pump Pack Adjustment—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Babbitt, bronze-backed.  
End Thrust Taken On—Center bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.0015".

### FUEL SYSTEM

Carburetor Make—Stromberg "AA-25."  
Type—Dual downdraft.  
Adjustment—Turn in for lean; out for rich mixture.  
Fuel Delivery—A. C. mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—30 lbs. at 60 m.p.h.  
Adjustment—None.  
Oil { Summer—Moderate speeds, S.A.E. 30;  
high speeds, S.A.E. 40-50.  
Winter—0°-32° S.A.E. 20W; below  
zero, S.A.E. 10W.

### PISTONS

Material—Bohn Lo-Ex alum. alloy, anodized finish.  
Clearance—Top—.025".  
Clearance—Bottom—.0021".

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0004 press one end, other .0000" clearance.  
Fit in Rod—.0002"-.0008".

### VALVES AND TAPPETS

Dia. Exhaust—1.626"-1.636".  
Dia. Intake—1.876"-1.886".  
Stem Dia.—Int. .3415"-.3425";  
Exh., .3405"-.3415".  
Seat Angle—45°.  
Seat Width—Int.  $\frac{1}{16}$ "; Exh.  $\frac{5}{64}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—Automatic adjustment.  
Exhaust—Automatic adjustment.  
Guides Removable—Yes.  
Spring Pressure—66 lbs. at 1.925".  
145 lbs. at 1.581".

## CHASSIS

### FRONT AXLE

Caster—Series 60— $\frac{1}{4}$ "— $+\frac{1}{4}$ "; Series 65, 70 and 75—0"— $+\frac{1}{4}$ ".  
Camber—Series 60— $\frac{1}{4}$ "-1°; Series 65, 70 and 75—0"— $\frac{1}{2}$ ".  
Toe-in—.0"— $\frac{1}{16}$ ".  
Kingpin Angle—Series 60—4°-51'; Series 65, 70 and 75—5°-38'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating: Series 60, hypoid; Series 65, 70 and 75, spiral bevel.  
Pinion Bearing Type—Series 60—N. D. Ball No. 5306SC and Hyatt No. 1287465.  
Series 65, 70 and 75—N. D. Ball No. 5307 and Hyatt No. 1287465.  
Bearing Adjustment—None; pinion adjustment, shims.  
End Play—Not given.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken.  
Adjustment—Thread.  
End Play—Not specified.  
Lubricant Capacity—Housing—2½ qts.

### TRANSMISSION

Make and Type—Own, helical gear.  
Main Shaft Bearing and No.—N. D. No. 47508.  
Countershaft Bearing Type and No.—Needle bearing.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—Series 60, 65 and 70— $25\frac{7}{8}$ " x  $2\frac{1}{2}$ " x  $\frac{1}{16}$ "; Series 75— $30\frac{1}{2}$ " x  $2\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments  
Eccentric for centralizing adjusting screw for clearance.  
Sliding anchor adjustment.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—  
Series 60—54½% front, 45½% rear.  
Series 65 and 70—56% front, 44% rear.  
Series 75—58% front, 42% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. 7502.  
Thrust Bearing Type and No.—N. D. CT 30F.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Series 60, thread; Series 65, 70 and 75, rubber.

### STEERING GEAR

Type—Worm and double roller.  
Adjustments—Column end play—adjusting nut at bottom.  
Cross-shaft end play—adjusting screw.  
Mesh—Eccentric bearing mounting.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 727V (4-pole).  
Drive—Solenoid operated gear.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts, 5500 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy, Series 60 and 65, No. 918C; 70 and 75, 961K.  
Drive—40° V-belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold—28-30 amps. max. cold.  
Output, hot—Depends on battery condition.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—Series 60 and 65—6.5-7.0 volts.  
Series 70 and 75—6.8-7.3 volts.  
Amps Discharge to Open—  
Series 60 and 65—6.5-7.0 volts.  
Series 70 and 75—6.8-7.3 volts.  
Field Fuse—None.

### IGNITION

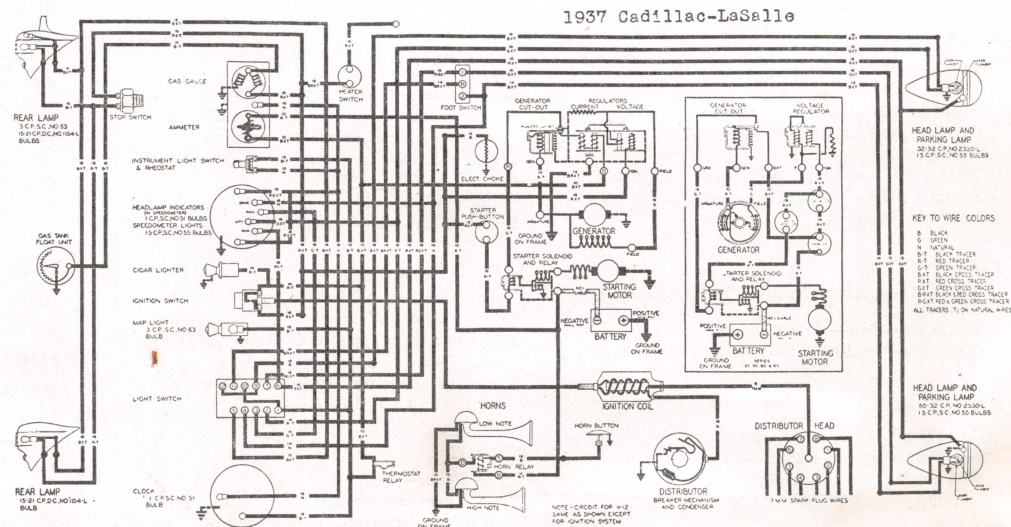
Distributor—Delco-Remy 665-G.  
Coil—Delco-Remy 539-C.  
Distr. Rotation—Clockwise.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025"-.027".  
Spark Plug Size—A. C. "K-7" 14 m/m.  
Manual Advance—20°.  
Automatic Advance—22°.  
Timing—5° before top center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—Series 60—110 amp. hr.  
Series 65, 70 and 75—130 amp. hr.

### LAMPS

Head—R. H., 32-50 C. P.; 32-32 C. P., L. H.  
Park—No. 55.  
Instrument—No. 55, No. 63 and No. 51.  
Fuse—None.  
Stop and Tail—No. 1154 and No. 63.





# Cadillac V-12, 1937

SERIES 85

## ENGINE

### DATA

No. of Cylinders—12.  
Bore— $3\frac{1}{8}$ ".  
Stroke—4".  
Taxable H. P.—46.9.  
Displacement—368 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—150 at 3600 r.p.m.

### CAMSHAFT

Drive—Morse No. 766 Duplex chain.  
Chain Data—110 links,  $1\frac{1}{2}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to flywheel marking.  
Bearings—4, replaceable.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0015"-.0026".

### CONNECTING RODS

End Clearance—.004"-.007".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity—4 $\frac{1}{4}$  gals.  
Pump Drive—Chain.  
Belt Size—34" V C to C  $13\frac{3}{4}$ " x  $\frac{7}{8}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt, steel-backed.  
End Thrust Taken On—No. 3 bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Detroit Model 51.  
Type—Two single carburetors.  
Adjustment—Idle adjustment only.  
High speed, fixed jets.  
Fuel Delivery—A. C. mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—9 qts.  
Oil Pressure—30 lbs. at 60 m.p.h.  
Adjustment—None.  
Oil { Summer—Moderate speeds, S.A.E. 30;  
high speeds, S.A.E. 40-50.  
Winter—0°-30° S.A.E. 20W; below  
zero, 10W.

### PISTONS

Material—Lynite Lo-Ex. alum. alloy, anodized finish.  
Clearance—Top—.019".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—Comp. .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—3.  
Width—.093"-.0935".  
No. Oil Rings—1.  
Width—.1540"-.1550".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—.0004" press locked end; .0000" in other end.  
Fit in Rod—Not specified.

### VALVES AND TAPPETS

Dia. Exhaust—1.384"-1.390".  
Dia. Intake—1.509"-1.515".  
Stem Dia.—.3392"-.3397".  
Seat Angle—45°.  
Seat Width—.664".  
Tappet Type—Roller.  
Clearance—Hot: Intake—None.  
Exhaust—None. (automatic).  
Guides Removable—Yes.  
Spring Pressure—  
Outer—50 lbs. at 1.922"  
Inner—19.5 lbs. at 1.751"  
Outer—115.5 lbs. at 1.578"  
Inner—51.5 lbs. at 1.407"

## CHASSIS

### FRONT AXLE

Caster—0° +  $\frac{1}{4}$ °.  
Camber—0° -  $\frac{1}{2}$ °.  
Toe-in—.0" -  $\frac{1}{16}$ ".  
Kingpin Angle—5° 38'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—N. D. No. 5307 and Hyatt No. 1287465.  
Bearing Adjustment—None; pinion adjustment, shims.  
End Play—Not specified.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  pts.

### TRANSMISSION

Make and Type—Own, constant mesh helical gear.  
Main Shaft Bearing Type and No.—N. D. No. 47508.  
Countershaft Bearing Type and No.—Needle bearing.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded on primary, woven on secondary shoe.  
Lining Size { 30" x 2 $\frac{1}{4}$ " x  $\frac{1}{4}$ " on rear.  
27 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ " x  $\frac{1}{4}$ " on front.  
Adjustments  
Eccentric for centralizing.  
Adjusting screw for clearance.  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—58% front, 42% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. No. 7202.  
Throwout Bearing Type and No.—N. D. No. CT-30-F.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded.

### STEERING GEAR

Type—Saginaw worm and double roller.  
Adjustments—Column end play—nut under bottom cover.  
Cross-shaft end play—adjusting screw.  
Mesh—Eccentric sleeve.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 580 (6-pole).  
Drive—Solenoid gear.  
Rotation—Counter-clockwise, viewing drive end.  
No Load—70 amps., 5.7 volts, 2200 r.p.m.  
Lock Torque—35 ft. lbs., 600 amps., 3 volts.  
Brush Spring Tension—36-40 oz.

### GENERATOR

Make—Delco-Remy No. 933M.  
Drive—Chain.  
Regulation—Current-voltage regulator.  
Thermostat—None.  
Output—Max. 26 amps., rate depends upon condition of battery. Charge rate constant at all speeds above 20 m.p.h.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.75 to 7.25 volts.  
Amps. Discharge to Open—0-2.  
Field Fuse—None.

### IGNITION

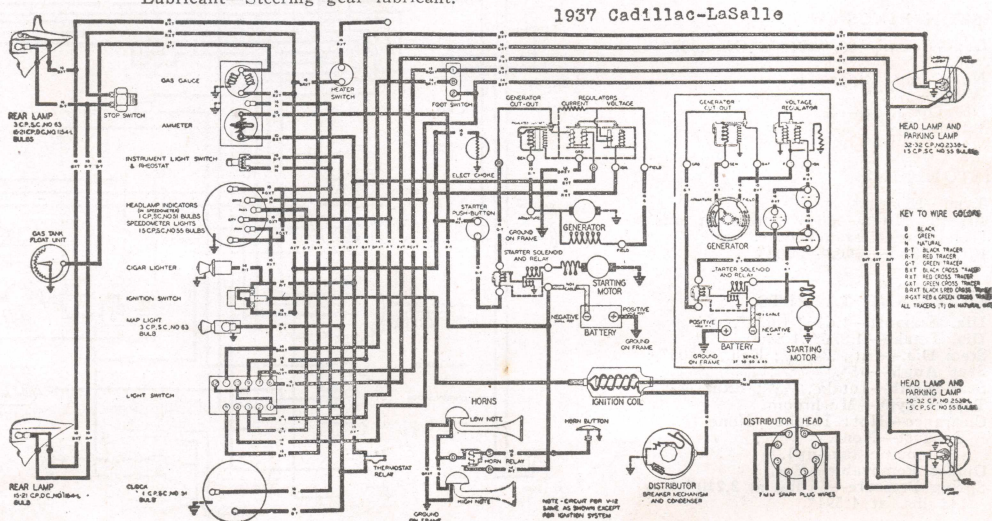
Distributor—Delco-Remy 667-C.  
Coil—Delco-Remy 553-E.  
Distr. Rotation—Counter-clockwise, viewing drive end.  
Breaker Gap—.018"-.024".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025"-.027".  
Spark Plug Size—A. C. "G7", 18 m/m.  
Manual Advance—20°.  
Automatic Advance—38°.  
Timing—10° before top dead center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—160 amp hrs.

### LAMPS

Head—R. H., 32-50 C. P.; L. H., 32-32 C. P.  
Park—No. 55.  
Instrument—No. 63, No. 55 and No. 51.  
Fuse—None.  
Stop and Tail—No. 1154 and No. 63.





# Cadillac V-8, 60

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{3}{8}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—36.45.  
Displacement—322.0 cu. in.  
Firing Order—1-8-7-3-6-5-4-2.  
Max. H. P.—125 at 3400 r.p.m.

### CAMSHAFT

Drive—Morse No. 3377.  
Chain Data—62 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to flywheel marking.  
Bearings—4.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0025"-.0037".

### CONNECTING RODS

End Clearance—.003"-.006".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity— $7\frac{1}{2}$  gals.  
Pump Drive—Belt.  
Belt Size— $34^{\circ}$ V, 1" wide.  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Babbitt, bronze backed.  
End Thrust Taken On—Center bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.0015".

### FUEL SYSTEM

Carburetor Make—Stromberg "E. E. 24."  
Type—Downdraft.  
Adjustment—Idle adjustment only.  
High speed, fixed jet.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—30 lbs. at 60 m.p.h.  
Adjustment—None.

Oil { Summer—Moderate speeds, S.A.E. No. 30.  
High speeds, S.A.E. No. 40-50-60.  
Winter— $0^{\circ}$ - $32^{\circ}$  S.A.E. No. 20W.  
Below  $0^{\circ}$ , S.A.E. No. 10W.

### PISTONS

Material—Lo-Ex. alum. alloy, T-slot, anodized.  
Clearance—Top—.023".  
Clearance—Bottom—.0019".

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0004" press fit one end; no clearance other end.  
Fit in Rod—.0002"-.0008".

### VALVES AND TAPPETS

Dia. Exhaust—1.626"-1.636".  
Dia. Intake—1.876"-1.886".  
Stem Dia.—Int., .3415"; Exh., .3405".  
Seat Angle— $45^{\circ}$ .  
Seat Width—Intake,  $\frac{1}{16}$ "; Exh.,  $\frac{5}{64}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—None.  
Exhaust—None.  
(Automatic take-up).  
Guides Removable—Yes.  
Spring Pressure—66 lbs. at 2.210".  
143 lbs. at 1.591".

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}^{\circ}$ - $2^{\circ}$ .  
Camber— $\frac{1}{4}^{\circ}$ - $1^{\circ}$ .  
Toe-in— $0^{\circ}$ - $\frac{1}{16}$ ".  
Kingpin Angle— $4^{\circ}$ - $51'$ .  
Tie-rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Ball and straight roller.  
Adjustment—Shims.  
End Play—Not specified.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken taper roller.  
Adjustment—Thread.  
End Play—Not specified.  
Lubricant Capacity—Housing— $2\frac{1}{2}$  qts.

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.—N. D.  
No. 47507 and 43306.  
Countershaft Bearing Type and No.—Hyatt,  
No. 92424.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded and woven.  
Lining Size— $25\frac{1}{2}$  x  $2$  x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding type anchor.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—56% front, 44% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No. 7202.  
Throwout Bearing Type and No.—N. D. Ball C. T. 34.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and double roller.  
Adjustments  
Column end play—adjusting nut bottom.  
Cross-shaft—adjusting screw.  
Mesh—eccentric.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 727-V.  
Drive—Solenoid-operated gear.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 6 volts, 5500 r.p.m.  
Lock Torque—16 ft. lbs., 3 volts, 600 amps.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco—961-D.  
Drive— $28^{\circ}$ V-belt,  $12\frac{2}{32}$ " x  $4\frac{9}{64}$ ".  
Regulation—Voltage and current regulation  
Thermostat—None.  
Output, cold—22 amps., 8.1-8.3 volts at 1900 r.p.m.  
Output, hot—Not specified.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.8 to 7.3 volts.  
Amps. Discharge to Open—0.2.  
Field Fuse—None.

### IGNITION

Distributor—Delco-Remy 665-D.  
Coil—Delco-Remy 539-C.  
Distr. Rotation—Clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025"-.027".  
Spark Plug Size—A. C. "K7," 14 m/m.  
Manual Advance— $20^{\circ}$ .  
Automatic Advance— $22^{\circ}$ .  
Vacuum Advance— $15^{\circ}$ .  
Timing— $5^{\circ}$  before top dead center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

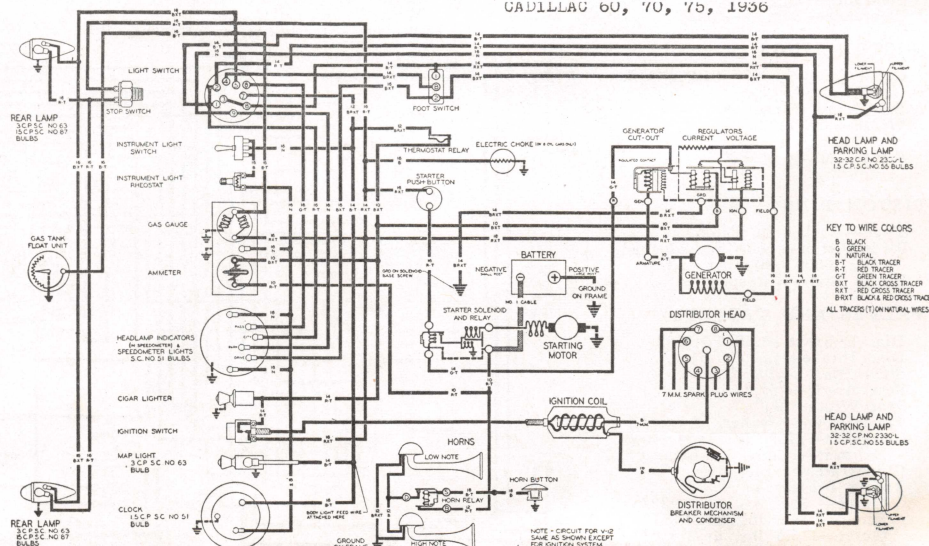
### BATTERY

Amps—110 amp. hr., Delco.

### LAMPS

Head—No. 3001.  
Park—No. 63.  
Instrument—No. 63.  
Fuse—None specified.  
Dome—No. 81.  
Stop and Tail—No. 87.

CADILLAC 60, 70, 75, 1936





# Cadillac V-12, 80 and 85

## ENGINE

### DATA

No. of Cylinders—12.  
Bore— $3\frac{1}{4}$ "  
Stroke—4"  
Taxable H. P.—46.9  
Displacement—368.0 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—150 at 3600 r.p.m.

### CAMSHAFT

Drive—Morse No. 766 Duplex.  
Chain Data—110 links,  $1\frac{1}{2}$ " wide,  $\frac{3}{4}$ " pitch.  
Valve Timing—Check to flywheel marking.  
Bearings—4.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0011"-.0026".  
Bearing Clearance—.0011"-.0026".

### CONNECTING RODS

End Clearance—.004"-.007".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity—4 $\frac{3}{4}$  gals.  
Pump Drive—Chain.  
Belt Size—34"V—14 $\frac{1}{4}$ " C. to C. x  $\frac{7}{8}$ " wide.  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt, steel back.  
End Thrust Taken On—No. 3 bearing.  
End Clearance—.001"-.005".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Detroit.  
Type—(2) updraft, expanding vane.  
Adjustment—Idle adjustment only.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—9 qts.  
Oil Pressure—30 lbs. at 60 m.p.h.  
Adjustment—None.  
Winter Oil—S.A.E. No. 20.  
Summer Oil—S.A.E. No. 40-50.

### PISTONS

Material—Lo-Ex. alum. alloy, T-slot, anodized.  
Clearance—Top—.019".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—3.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—1.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—.0004" press in locked end; .0000" clearance free end.  
Fit in Rod—.0002"-.0008".

### VALVES AND TAPPETS

Dia. Exhaust—1.384"-1.390".  
Dia. Intake—1.509"-1.515".  
Stem Dia.— $\frac{11}{32}$ ".  
Seat Angle—45".  
Seat Width— $\frac{5}{64}$ ".  
Tappet Type—Roller.  
Clearance—Hot: Intake—None.  
Exhaust—None.  
(Automatic adjustment).  
Guides Removable—Yes.  
Spring Pressure  
69 lbs.—Outer spring, 1.922".  
Inner spring, 1.751".  
167 lbs.—Outer spring, 1.578".  
Inner spring, 1.407".

## CHASSIS

### FRONT AXLE

Caster— $\frac{3}{4}$ "-1 $\frac{1}{4}$ ".  
Camber—0°- $\frac{1}{2}$ ".  
Toe-in—0- $\frac{3}{16}$ ".  
Kingpin Angle—5°-38'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Ball and straight roller.  
Adjustment—Shim.  
End Play—Not specified.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken taper roller.  
Adjustment—Thread.  
End Play—Not specified.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  qts.

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.—N. D. 47511 and 47608.  
Countershaft Bearing Type and No.—N. D. 3206 and 47507.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded and woven.  
Lining Size—30" x 2 $\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding anchor.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—58% front, 42% rear.

### CLUTCH

Type—Long dry plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. ball, 7202.  
Throwout Bearing Type and No.—N. D. ball, C. T. 34.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber and thread.

### STEERING GEAR

Type—Worm and double roller.  
Adjustments—Column end play—adjusting nut at bottom. Cross-shaft—adjusting screw.  
Mesh—eccentric.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 580 (6-pole).  
Drive—Solenoid gear.  
Rotation—Counter-clockwise, viewing pinion.  
No Load—70 amps., 5.7 volts, 2200 r.p.m.  
Lock Torque—35 ft. lbs., 3 volts, 600 amps.  
Brush Spring Tension—36-40 oz.

### GENERATOR

Make—Delco-Remy 933-M.  
Drive—Chain.  
Regulation—Voltage and current regulation.  
Thermostat—None.  
Output, cold—22 amps., 8.1-8.3 volts, 1900 r.p.m.  
Output, hot—Not specified.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing driving end.  
Cutout to Close—6.75-7.25 volts.  
Amps. Discharge to Open—0.2.  
Field Fuse—None.

### IGNITION

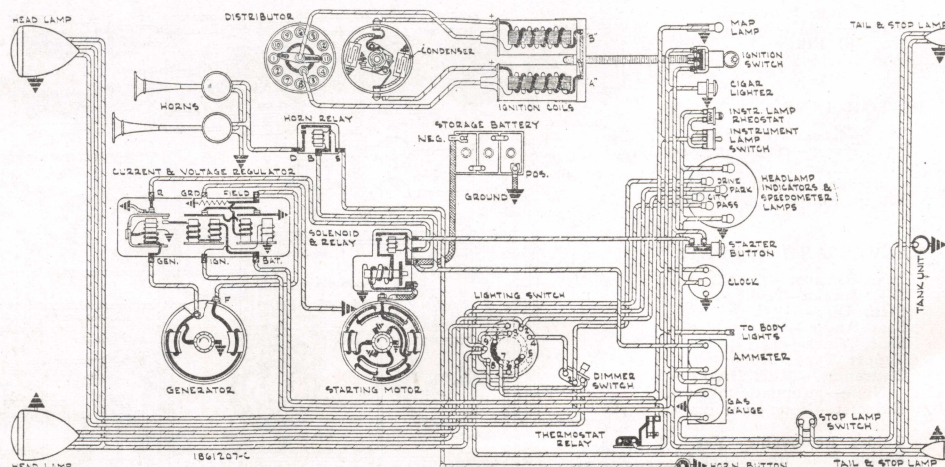
Distributor—Delco-Remy 667-C.  
Coil—Delco-Remy 553-E.  
Distr. Rotation—Not specified.  
Breaker Gap—.018"-.024".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025"-.027".  
Spark Plug Size—A. C. "G6"—18 m/m.  
Manual Advance—20°.  
Automatic Advance—38°.  
Vacuum Advance—None.  
Timing—10° before top center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—160 amp. hr., Delco.

### LAMPS

Head—No. 3001.  
Park—No. 63.  
Instrument—No. 63.  
Fuse—None specified.  
Dome—No. 81.  
Stop and Tail—No. 87.



CADILLAC 12, 1936  
36-80, 36-85



# Cadillac V-16, 1935, 1936

## ENGINE

### DATA

No. of Cylinders—16 V-Type.  
Bore—3".  
Stroke—4".  
Taxable H. P.—57.5.  
Displacement—452 cu. in.  
Firing Order—Front—2-4-6-8-10-12-14-16.  
1-3-5-7-9-11-13-15.  
Max. H. P.—185 at 3800 r.p.m.

### CAMSHAFT

Drive—Morse chain No. 766 Duplex.  
Chain Data—110 links  $1\frac{1}{2}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to flywheel marking.  
Bearings—5, replaceable.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0015".

### CONNECTING RODS

End Clearance—.006"-.012".  
Dia. Clearance—.0010"-.0025".

### COOLING SYSTEM

Capacity—5.7 gal.  
Pump Drive—Chain.  
Belt Size—34" V center to center 14",  $\frac{7}{8}$ " wide.  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel backed babbitt.  
End Thrust Taken On—No. 4.  
End Clearance—.001"-.005".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Detroit Lubricator.  
Type—Up draft—two single.  
Adjustment—Idle adjustment only. High speed fixed jets.  
Fuel Delivery—A. C. mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—10 qts.  
Oil Pressure—30 lbs. at 60 m.p.h.  
Adjustment—None.  
Winter Oil—S. A. E. 20.  
Summer Oil—S. A. E. 40 or 50.

### PISTONS

Material—Lo-Ex. Alum. alloy, anodized finish.  
Clearance—Top—.018".  
Clearance—Bottom—.0018".

### PISTON RINGS

Gap—Comp., .007"-.012";  
Oil, .007"-.015".  
No. Comp. Rings—3.  
Width—.093".  
No. Oil Rings—1.  
Width—.1545".

### PISTON PINS

Type—Locked in Piston.  
Fit in Piston—.0004" pressed locked end, .0000" opposite end, piston heated.  
Fit in Rod—.0002"-.0008".

### VALVES AND TAPPETS

Dia. Exhaust—1.384".  
Dia. Intake—1.509".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—45".  
Seat Width—.564".  
Tappet Type—Roller.  
Clearance—Hot: Intake—None—automatic take-up.  
Exhaust—None—automatic take-up.  
Guides Removable—Yes.  
Spring Pressure—Inner 18-21 lbs. at  $1\frac{1}{4}$ "; 49-54 lbs. at 1.407"; center, 48-52 lbs. at 1.922"-111-120 lbs. at 1.578".

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ ".  
Camber—1".  
Toe-in— $\frac{1}{8}$ "-. $\frac{3}{16}$ ".  
Kingpin Angle—4".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type— $\frac{3}{4}$ " floating.  
Pinion Bearing Type—N. D. 5308 and 1310.  
Adjustment—Shim.  
End Play—Not specified.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken 387 and 383.  
Adjustment—Thread.  
End Play—Not specified.  
Lubricant Capacity—Housing—3 qts.

### TRANSMISSION

Make and Type—Own Synchro-mesh.  
Main Shaft Bearing Type and No.—N. D. 47511 and 47608.  
Countershaft Bearing Type and No.—N. D. 47507 and 3206.

### BRAKES

Type—Own Huck type, power operated.  
Lining Type—Woven.  
Lining Size— $29\frac{7}{32}$ " x 2". Forward shoe .245".  
Reverse shoe .183".  
Adjustments—Cam and adjusting screw.  
Anchor mounting.  
Clearance—Top—.007".  
Bottom—.007".  
Brake Effort—60% front—40% rear.

### CLUTCH

Type—Own dry plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. 7204.  
Throwout Bearing Type and No.—Ball No. 2605-A.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber and thread, non-adjustable.

### STEERING GEAR

Type—Worm and double roller.  
Adjustments—Worm shaft, nut under bottom cover; Cross shaft, adjusting screw; Mesh, eccentric sleeve.  
Lubricant—Steering gear oil, S-200.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 580 (6 pole).  
Drive—Manual gear—solenoid shift.  
Rotation—Counter-clockwise.  
No Load—70 amps., 5.7 volts, 2200 r.p.m.  
Lock Torque—35 ft. lbs., 600 amps., 3 volts.  
Brush Spring Tension—36-40 oz.

### GENERATOR

Make—Delco-Remy No. 933-C.  
Drive—Chain.  
Regulation—Current controlled.  
Thermostat—None.  
Output, cold—Lights on, 20.5 amps., lights off, 15 amps.  
Output, hot—Lights on, 20.5 amps., lights off, 10 amps.  
Brush Spr. Tension—20-28 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.75 to 7.25 volts.  
Amps. Discharge to Open—0.2 amps.  
Field Fuse—6 amps.

### IGNITION

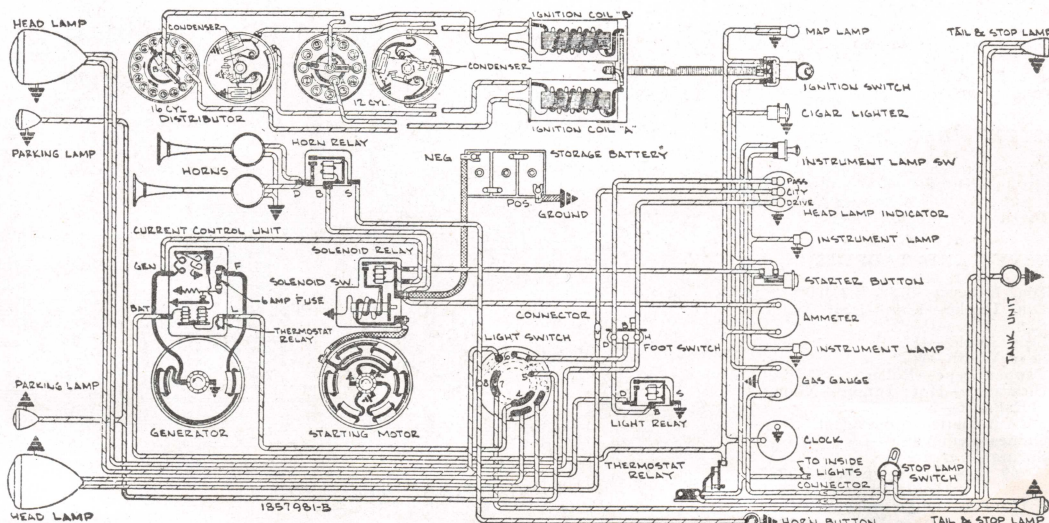
Distributor—Delco-Remy No. 4118.  
Coil—Delco-Remy 553-E.  
Distr. Rotation—Clockwise.  
Breaker Gap—.014"-.016".  
Brush Spr. Tension—17-21 oz.  
Sp. Plug Gap—.025"-.027".  
Sp. Plug Size—A. C. G-6—18 m/m.  
Manual Advance—20° engine.  
Automatic Adv.—34° engine.  
Timing—4° before top dead center.  
Coil Amps., Engine Idling—2.2 amps.  
Coil Amps., Engine Stopped—4.4 amps.

### BATTERY

Amps.—Delco 190 amp. hr.

### LAMPS

Head—2330-L.  
Park—63-L.  
Instrument—63-L.  
Fuse—Not specified.  
Dome—81-L.  
Stop and Tail—87 and 63-L.





# Chevrolet Master and DeLuxe, 1938

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{2}$ "  
Stroke— $3\frac{3}{4}$ "  
Taxable H. P.—29.4.  
Displacement—216.5 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—85 at 3200 r.p.m.

### CAMSHAFT

Drive—Gears (.002"—.005" lash).  
Chain Data—Not given.  
Valve Timing—Gear marks in mesh.  
Bearings—Split replaceable bushings.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—.002"—.004".

### CONNECTING RODS

End Clearance—.010".  
Dia. Clearance—.0017".

### COOLING SYSTEM

Capacity—14 qts.  
Pump Drive—Fan belt.  
Belt Size— $32^{\circ}$  V,  $42\frac{7}{8} \times 1\frac{1}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt, steel-backed.  
End Thrust Taken On—Rear center bearing.  
End Clearance—.0055".  
Dia. Clearance—.003" average.

### FUEL SYSTEM

Carburetor Make—Carter "W-1"  
Type—Single downdraft.  
Adjustment—Idle adjustment only—1 to 2 turns open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure— $13\frac{1}{2}$  lbs. at 50 m.p.h.  
Adjustment—Idle, 1 to 2 turns open.  
Oil { Not lower than  $32^{\circ}$  F. S.A.E. 20W. or 20  
As low as  $+10^{\circ}$  F. S.A.E. 20W.  
As low as  $-10^{\circ}$  F. S.A.E. 10W.  
Below  $-10^{\circ}$  F. S.A.E. 10W. +  
10% kerosene.

### PISTONS

Material—Cast iron, tin-plated.  
Clearance—Top—.0095".  
Clearance—Bottom—.0022".

### PISTON RINGS

Gap—All rings .010" average (.004"—.014").  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Lock in rod.  
Fit in Piston—Slip fit.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{4}$ ".  
Stem Dia.—.341".  
Seat Angle— $30^{\circ}$ .  
Seat Width— $\frac{1}{16}$ "— $\frac{3}{32}$ ".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.006" min.  
Exhaust—.013" min.  
Guides Removable—Yes.  
Spring Pressure—45 lbs. at  $1\frac{1}{8}$ ".  
125-133 lbs. at  $1\frac{1}{2}$ ".  
Free length,  $2\frac{7}{32}$ ".

## CHASSIS

### FRONT AXLE

Caster—Master,  $1\frac{3}{4}$ "— $2\frac{3}{4}$ "; DeLuxe,  $0^{\circ}$ .  
Camber—Master,  $\frac{1}{2}$ "— $1\frac{1}{2}$ "; DeLuxe,  $\frac{1}{4}$ ".  
Toe-in—Master,  $\frac{9}{64}$ "— $\frac{1}{8}$ "; DeLuxe,  $\frac{1}{16}$ "— $\frac{3}{32}$ ".  
Kingpin Angle—Master,  $7\frac{1}{2}$ "— $101^{\circ}$ ; DeLuxe,  $7\frac{3}{4}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—N. D. 5306 and Hyatt C1506.  
Adjustment—Shims and tapered collar.  
End Play—Not given.  
Lash—.006".  
Diff. Bearing Type—Hyatt KA 11360Z.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed.  
Main Shaft Bearing Type and No.—N. D. 43207 and 43305.  
Countershaft Bearing Type and No.—Bronze  $\frac{7}{8} \times 1\frac{1}{4} \times 1\frac{1}{4}$ ".

### BRAKES

Type—Own, hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{5}{8} \times 1\frac{3}{4} \times \frac{3}{16}$ ".  
Adjustments—Adjusting for clearance of each shoe.  
Clearance  
Top { Adjust to slight drag, then back  
Bottom { off 4 notches.  
Brake Effort— $52\frac{1}{2}\%$  front,  $47\frac{1}{2}\%$  rear.

### CLUTCH

Type—Own, single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—N. D. 7109.  
Throwout Bearing Type and No.—N. D.—CT 27.

### SPRINGS

Type Front—Master, Semi-elliptic; DeLuxe, coil.  
Type Rear—Mast. and DeLuxe, semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Saginaw worm and roller tooth.  
Adjustments  
Column end play—Adjusting plug at top.  
Cross-shaft end play—adjusting screw.  
Mesh—eccentric.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy.  
Drive—Over-running clutch.  
Rotation—Clockwise viewing pinion  
No Load—125 amps., 5.4 volts, 2500 r.p.m.  
Lock Torque—14 ft. lbs., 525 amps., 3.4 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy No. 1100004.  
Drive—Fan belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold—28 amps., 8.0 volts, 3400 r.p.m. armature.  
Output, hot— $26\frac{1}{2}$  amps., 8.0 volts, 3600 r.p.m. armature.  
Brush Spring Tension—Main 22-26; third brush 16-20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.5-7 volts at 8 to 9 m.p.h.  
Amps. Discharge to Open—0-3.0 amps.  
Field Fuse—None.

### IGNITION

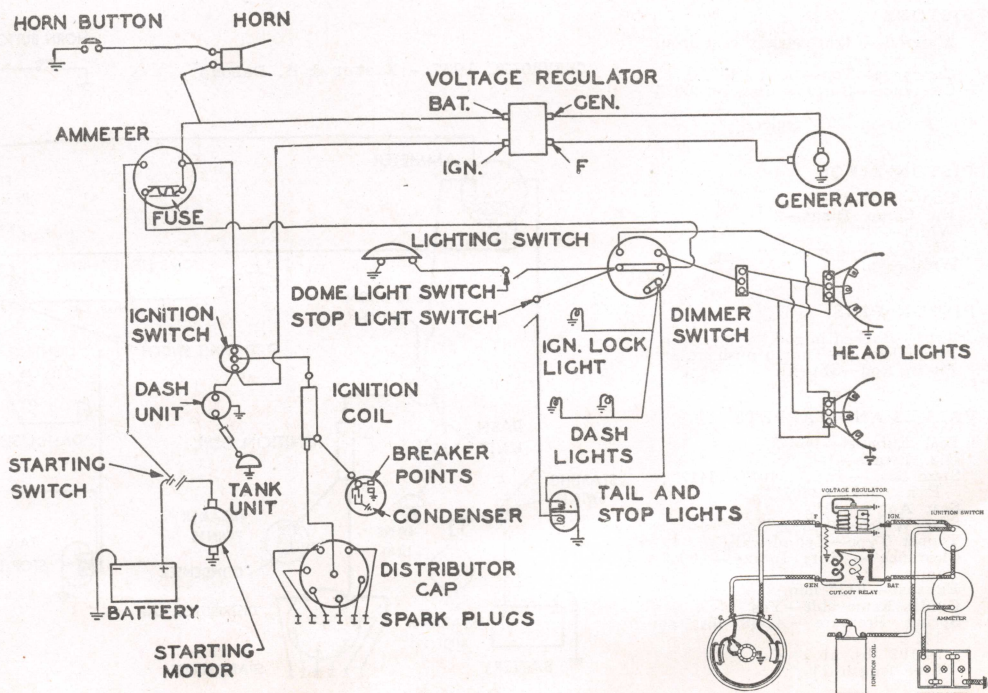
Distributor—Delco-Remy No. 1110008.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise viewing drive end.  
Breaker Gap—.018".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.037"—.040".  
Spark Plug Size—14 m/m A. C. No. 46 "Blue top."  
Manual Advance— $20^{\circ}$  engine.  
Automatic Advance— $46^{\circ}$ .  
Vacuum Advance— $17^{\circ}$ .  
Timing— $5^{\circ}$  before top dead center—points should break when steel ball in flywheel is opposite pointer on flywheel housing.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.8 amps.

### BATTERY

Amps.—100 amp. hr.

### LAMPS

Head—32-21 c. p., 6-8 v.  
Park—3 c. p., 6-8 v.  
Instrument—3 c. p., 6-8 v.  
Fuse—15 amps.  
Dome—3 c. p., 6-8 v.  
Stop and Tail—15 c. p. and 3 c. p., 6-8 v.





# Chevrolet, 1937

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{2}$ ".  
Stroke— $3\frac{3}{4}$ ".  
Taxable H. P.—29.5.  
Displacement—216.5 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—85 at 3200 r.p.m.

### CAMSHAFT

Drive—Gears (lash .002"-.005").  
Chain Data—Not given.  
Valve Timing—Tooth marking on gears.  
Bearings—4, steel-backed babbitt.  
End Thrust Taken On—Free to .003" end play.  
Bearing Clearance—.002"-.004".

### CONNECTING RODS

End Clearance—.004" min., .012" max.  
Dia. Clearance—.0005"-.002".

### COOLING SYSTEM

Capacity—14 qts.  
Pump Drive—Belt.  
Belt Size—32" V,  $42\frac{7}{8}$ " x  $\frac{5}{8}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Self-adjusting.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear center bearing.  
End Clearance—.004"-.007".  
Dia. Clearance—.002"-.004".

### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Downdraft single.  
Adjustment—Idle adjustment one to two turns open.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure feed and dippers.  
Pump Type—Gear.  
Capacity—5 qts. (refill).  
Oil Pressure— $13\frac{1}{2}$  lbs. at 50 m.p.h.  
Adjustment—None.  
Oil { Consistently above 80°F. S.A.E. No. 30  
Lowest temperature 50°F. S.A.E. No. 30  
Lowest temperature 30°F. S.A.E. No. 20  
Lowest temperature 10°F. S.A.E. No. 20 W  
Lowest temperature 10°F. S.A.E. No. 10 W  
Lowest temperature 30°F. S.A.E. No. 10 W  
plus 10% kerosene.

### PISTONS

Material—Light weight cast iron, slipper type, plated.  
Clearance—Top—.006"-.013".  
Clearance—Bottom—Pass on .002" feeler.  
Tight on .003" feeler.

### PISTON RINGS

Gap—.004"-.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{1}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—Thumb push fit.  
Fit in Rod—Slip fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{1}{4}$ ".  
Stem Dia.—Int., .3407"-.3417";  
Exh., .3397"-.3407".  
Seat Angle—30°.  
Seat Width— $\frac{1}{16}$ "-.332".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.006" min.  
Exhaust—.013" min.  
Guides Removable—Yes.  
Spring Pressure—42-48 lbs. at  $1\frac{1}{8}$ ".  
94-102 lbs. at  $1\frac{3}{16}$ ".  
Free length  $2\frac{3}{32}$ ".

## CHASSIS

### FRONT AXLE

Caster— $2\frac{3}{4}$ " + or —  $\frac{1}{2}$ ", De Luxe Model 0°.  
Camber— $1\frac{1}{2}$ " + or —  $\frac{1}{2}$ ", De Luxe Model  $\frac{1}{4}$ ".  
Toe-in— $\frac{5}{16}$ "-. $\frac{1}{8}$ ", De Luxe Model  $\frac{1}{16}$ "-. $\frac{3}{32}$ ".  
Kingpin Angle—7°-10° + or — 1°, De Luxe Model  $7\frac{3}{4}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid gears.  
Pinion Bearing Type—Ball and straight roller.  
Adjustment—Thread.  
End Play—Not given.  
Lash—.004"-.008".  
Diff. Bearing Type—Barrel type.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, helical gears on second synchro-mesh.  
Main Shaft Bearing Type and No.—N. D. 43207 and 43305.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{3}{4}$ " x  $1\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Adjusting wheel for clearance.  
Clearance  
Top { Tighten to slight drag, then back  
Bottom } off 4 notches.  
Brake Effort—53% front, 47% rear.

### CLUTCH

Type—Single plate.  
Facing Type—Braided, moulded.  
Pilot Bearing Type and No.—Ball N. D. 7109.  
Throwout Bearing Type and No.—Carbon type.

### SPRINGS

Type Front—Semi-elliptic, Master; coil, De Luxe.  
Type Rear—Semi-elliptic, all models.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Master, worm and tractor; De Luxe, worm and roller.  
Adjustments  
Column end play—Jacket clamp.  
Cross-shaft—adjusting screw mesh—eccentric.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy.  
Drive—Bendix.  
Rotation—Clockwise viewing pinion.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.6 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—21 amps., 8.5 volts, 2400 r.p.m.  
Output, hot—18 amps., 8.3 volts, 2900 r.p.m.  
Brush Spring Tension—Main 22-26 oz., third 16-20 oz.  
Rotation—Not given.  
Cutout to Close—6-8 volts at 800 r.p.m. armature speed.  
Amps. Discharge to Open—0.  
Field Fuse—None.

### IGNITION

Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise viewing drive end.  
Breaker Gap—.018".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.037"-.042".  
Spark Plug Size—A. C. "K-11," 14 m/m.  
Manual Advance—None.  
Automatic Advance—50°.  
Vacuum Advance—17°.  
Timing—5 degrees before top dead center.  
Flywheel ball behind pointer at 400 r.p.m.  
Coil Amps., Engine Idling—2.5.  
Coil Amps., Engine Stopped—4.8.

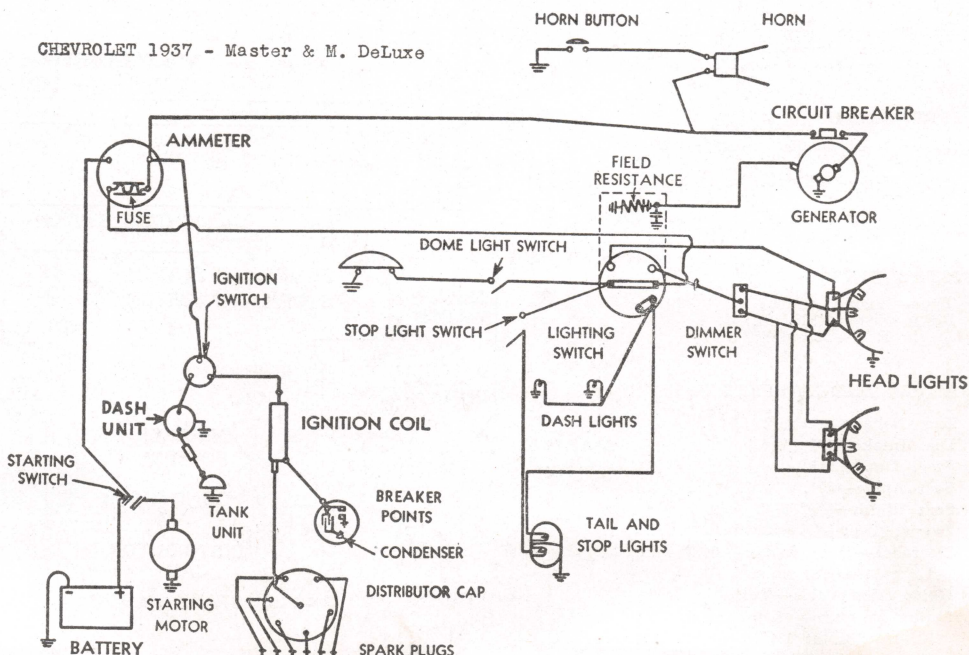
### BATTERY

Amps.—100 amp. hr.

### LAMPS

Head—32-21 C. P.—6-8V.  
Park—3 C. P.—6-8V.  
Instrument—3 C. P.—6-8V.  
Fuse—15 amps.  
Dome—3 C. P.—6-8V.  
Stop and Tail—15 C. P. and 3 C. P.—6-8V.

CHEVROLET 1937 - Master & M. DeLuxe





# Chevrolet Master 6, 1935

## DeLuxe Model

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{16}$ ".  
Stroke—4".  
Taxable H. P.—26.30.  
Displacement—206.8 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—80 at 3200 r.p.m.

#### CAMSHAFT

Drive—Gears.  
Chain Data—Gears.  
Valve Timing—Gear marking.  
Gear back lash—.002"-.005".  
Bearings—Clearance—.002"-.004".  
End Thrust Taken On—Thrust bearing front end—End play free to .003".  
Bearing Clearance—.002"-.004" center bearing.

#### CONNECTING RODS

End Clearance—.004"-.011".  
Dia. Clearance—.0005"-.002".

#### COOLING SYSTEM

Capacity— $2\frac{3}{4}$  gal.  
Pump Drive—Belt.  
Belt Size— $32^{\circ}$ V— $39\frac{3}{4} \times 2\frac{1}{2}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

#### CRANKSHAFT

No. Bearings—3.  
Material—Steel back babbitt.  
End Thrust Taken On—Center bearing.  
End Clearance—.004"-.007".  
Dia. Clearance—.001"-.003".

#### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Down draft single.  
Adjustment—Low speed  $\frac{1}{2}$ -1 $\frac{1}{2}$  turns open.  
High speed, fixed jets.  
Fuel Delivery—A. C. Mechanical pump.

#### LUBRICATION

Type—Pressure and splash.  
Pump Type—Vane.  
Capacity—5 qts.  
Oil Pressure—12 lbs. at 50 m.p.h.  
Adjustment—None.  
Oil Recommended—Above 75°F. S. A. E. 20  
75°F to 32°F, S. A. E. 20-W.  
32°F to 15°F, S. A. E. 10-W.  
15°F and below, S. A. E. 10-W + 10% kerosene.

#### PISTONS

Material—Cast iron—electro-plated.  
Clearance—Top—.015".  
Clearance—Bottom—.0015"-.003".

#### PISTON RINGS

Gap—Comp., .005"-.015"; oil, .013"-.021".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Locked in Rod.  
Fit in Piston—Thumb push fit.  
Fit in Rod—Clamp fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{2}$ ".  
Dia. Intake— $1\frac{1}{2}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—30°.  
Seat Width— $\frac{1}{16}$ "-. $\frac{3}{32}$ ".  
Tappet Type—Cast-chilled head.  
Clearance—Hot: Intake—.006" min.  
Exhaust—.013" min.  
Guides Removable—Yes.  
Spring Pressure—45 lbs. at  $\frac{1}{16}$ ".  
98 lbs. at  $\frac{1}{4}$ ".

### CHASSIS

#### FRONT AXLE

Caster—0°.  
Camber— $\frac{1}{4}$ ".  
Toe-in— $\frac{3}{64}$ "-. $\frac{1}{8}$ ".  
Kingpin Angle—7 $\frac{3}{4}$ ".  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—N. D. 5206 and 1105 or Hyatt No. 125630.  
Adjustment—Shims and tapered collar.  
End Play—Not specified.  
Lash—.006"-.010".  
Diff. Bearing Type—N. D. Difrax No. 2100.  
Adjustment—None.  
End Play—.018" in bearing—none when assembled.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  pts.

#### TRANSMISSION

Make and Type—Own Synchro mesh.  
Main Shaft Bearing Type and No.—N. D. 3208 and 7506.  
Countershaft Bearing Type and No.—Bronze  $\frac{7}{8}$ " x  $1\frac{1}{4}$ ".

#### BRAKES

Type—Own Huck type.  
Lining Type—Semi-moulded.  
Lining Size— $24\frac{1}{2}$ " x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Adjusting screw, centralizer.  
Clearance—Top—Bottom—Set to rub slightly at assembly.  
Brake Effort—50-50.

#### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—N. D. 7109.  
Throwout Bearing Type and No.—Graphite Comp.  $1\frac{1}{2}$ " x  $2\frac{3}{8}$ " x  $\frac{3}{4}$ ".

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded, self-adjusting.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments—Worm end play—Mast jacket clamp; Sector shaft, adjusting screw; Back lash, eccentric bolt.  
Lubricant—Steering gear lubricant every 1000 miles.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Delco-Remy 738-G.  
Drive—Bendix.  
Rotation—Clockwise viewing pinion.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—14 ft. lbs., 525 amps., 3.4 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Delco-Remy 935-V.  
Drive—Belt.  
Regulation—Third brush and field resistance.  
Thermostat—None.  
Output, cold—20 amps., 8.2 volts, 2400 r.p.m.  
Output, hot—17 amps., 8.2 volts, 2450 r.p.m.  
26 m.p.h.  
Brush Spr. Tension—(Main) 22-26 oz., (third) 16-20 oz.  
Rotation—Clockwise viewing from drive end.  
Cutout to Close—7.2 volts at 7.2 m.p.h.  
Amps Discharge to Open—1.5 amps.

#### IGNITION

Distributor—Delco-Remy 645-G.  
Coil—Delco-Remy 536-D.  
Distr. Rotation—Counter-clockwise viewing drive end.  
Breaker Gap—.018"-.021".  
Brush Spr. Tension—17-21 oz.  
Sp. Plug Gap—.032"-.035".  
Sp. Plug Size—A. C. K-11—14 m/m.  
Manual Advance—20° engine Vernier Manual adjustment.  
Automatic Adv.—32° engine at 3000 r.p.m.  
Vacuum advance 12° max.  
Timing—5° before dead center advanced.  
Points to break when steel ball is opposite pointer on flywheel housing.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.8 amps.

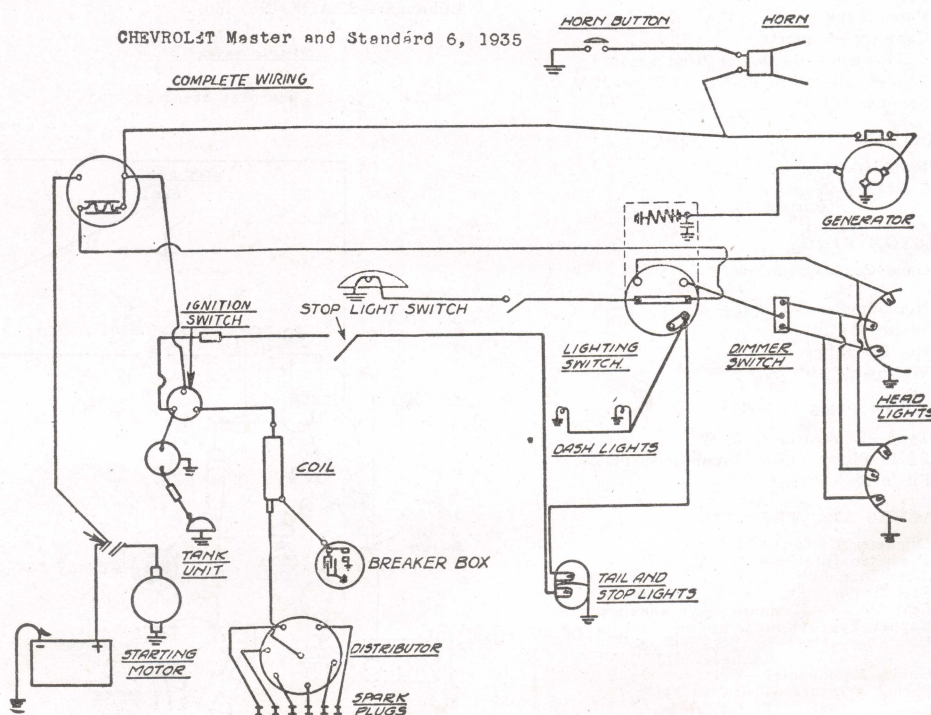
#### BATTERY

Amps.—Delco 90 amp. hr.

#### LAMPS

Head—32-21 C.P., S.C., 6-8 volt.  
Park—3 C.P., S.C., 6-8 volt.  
Instrument—3 C.P., S.C., 6-8 volt.  
Fuse—15 amps on ammeter.  
Dome—3 C.P., S.C., 6-8 volt.  
Stop—15 C.P., S.C., 6-8 volt.  
Tail—3 C.P., S.C., 6-8 volt.

CHEVROLET Master and Standard 6, 1935





# Chevrolet, 1934, Standard 6

## ENGINE

### DATA

No. of Cylinders—6".  
Bore—3 $\frac{1}{8}$ ". Stroke—3 $\frac{1}{2}$ ".  
Taxable H. P.—26.3.  
Displacement—180.96 cu. in.  
Firing Order—1-5-3-6-2-4.  
Maximum H. P.—60 at 3000 r.p.m.

### CAMSHAFT

Drive—Steel and fabric gears.  
Valve Timing—Punch marks in line opposite each other.  
Bearings—3.  
End Thrust—Taken on thrust plate; free to .003" maximum end play.  
Bearing Clearance—.002" - .004".

### CONNECTING RODS

End Clearance—.0065" - .0135".  
Diameter Clearance—.0003" - .0018".

### COOLING SYSTEM

Capacity—10 quarts.  
Pump Drive—Fan belt.  
Belt Size—32° V,  $\frac{3}{8}$ " wide.  
Belt Adjustment—Generator mounting.  
Pump Packing Adjustment—Thread.

### CRANKSHAFT

No. Bearings—3.  
Material—Steel-backed babbitt.  
End Thrust—Taken on center bearing.  
End Clearance—.004" - .007".  
Diameter Clearance—.001" - .003".

### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Downdraft.  
Adjustment—Idle,  $\frac{1}{2}$  to  $1\frac{1}{2}$  turns open; high speed fixed.  
Fuel Delivery—A. C.

### LUBRICATION

Type—Pressure and splash.  
Pump Type—Vane.  
Capacity—5 quarts.  
Oil Pressure—14 lbs. at 30 m.p.h.  
Winter Oil—S. A. E. No. 10-W or 20-W.  
Summer Oil—S. A. E. No. 30.

### PISTONS

Material—Cast iron.  
Clearance—Top, .011".  
Bottom, .002" - .003" cold.

### PISTON RINGS

Gap—Compression, .005" - .015";  
Oil, .004" - .014".  
No. Compression Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—Light thumb-push fit.  
Fit in Rod—Slip fit.

### VALVES AND TAPPETS

Diameter Exhaust—1 $\frac{1}{8}$ ".  
Diameter Intake—1 $\frac{3}{8}$ ".  
Stem Diameter— $\frac{5}{16}$ ".  
Seat Angle—45°.  
Seat Width—Minimum  $\frac{1}{16}$ "; maximum  $\frac{3}{16}$ ".  
Tappet Type—Round, hollow.  
Clearance—Hot: Intake, .006".  
Exhaust, .013".  
Guides Removable?—Yes.  
Spring Pressure—40 lbs. at  $1\frac{1}{4}$ ";  
75 lbs. at  $1\frac{3}{4}$ ".

## CHASSIS

### FRONT AXLE

Caster—2° 15'.  
Camber—1 $\frac{1}{2}$ ".  
Toe-in—.139" to .177".  
Kingpin Angle—7° 10'.  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—N. D. Ball, 905113 and 901106.  
Adjustment—Shims and tapered collar.  
Lash—.006" to .010".  
Differential Bearing Type—N. D. Ball, 902103.  
Adjustment—Thread.  
Lubricant Capacity Housing—3 $\frac{1}{2}$  pints.

### TRANSMISSION

Make and Type—Own, 3-speed.  
Main Shaft Bearing Type and No.:  
N. D. 954111 and 903205.  
Countershaft Bearing Type—Bronze bushing.

### BRAKES

Type—G. M. C. Huck mechanical.  
Lining Size—15 $\frac{3}{4}$ " x 1 $\frac{1}{2}$ " x  $\frac{3}{16}$ ".  
Adjustments—Anchor, none;  
Shoes, cam and lever centralizer.  
Clearance—Top, set to rub slightly.  
Bottom, set to rub slightly.  
Brake Effort—50/50.

### CLUTCH

Type—Single plate (own).  
Facing Type—Braided, molded.  
Pilot Bearing Type and No.—Hyatt, 142655.  
Throwout Bearing Type—Molded graphite.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Self-adjusting.

### STEERING GEAR

Type—Worm and sector type.  
Adjustments:  
Worm Shaft—Adjusting nut.  
Cross Shaft—Threaded.  
Gear Mesh—Eccentric shims.  
Lubricant—S. A. E. No. 160.

COMPLETE WIRING

Chevrolet Standard, 1934

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy, Model 714-L.  
Drive—Bendix.  
Rotation—Clockwise, viewing pinion.  
No Load—75 amps., 5.75 volts, 3500 r.p.m.  
Lock Torque—14 ft. lbs., 420 amps., 3.75 volts.  
Brush Spring Tension—24 to 28 oz.

### GENERATOR

Make—Delco-Remy, 943-J.  
Drive—Fan belt.  
Regulation—Third brush.  
Output—Cold, 16-18 amps., 8.2 volts;  
1700 r.p.m.  
Hot, 12 amps., 7.6 volts.  
2200 r.p.m.  
Brush Spring Tension—14 to 18 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.2 volts at 7 m.p.h.  
Amps. Discharge to Open—1.

### IGNITION

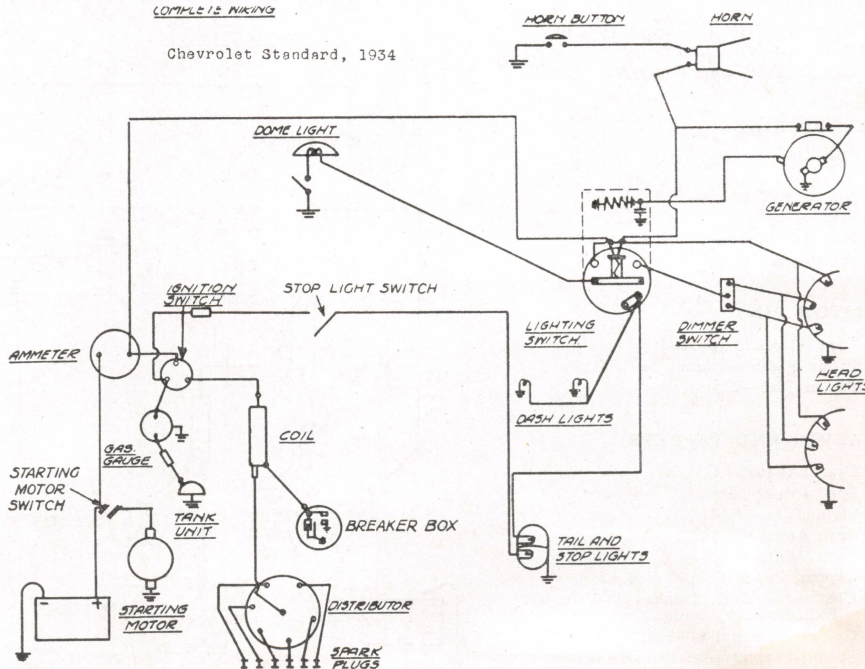
Distributor—Delco-Remy, 622-L.  
Coil—Delco-Remy, 538-C.  
Distributor Rotation—Counter-clockwise, viewing drive end.  
Breaker Gap—.018".  
Brush Spring Tension—17 to 21 oz.  
Spark Plug Gap—.032".  
Spark Plug Size—A. C. "K-9," 14 mm.  
Manual Advance—None.  
Automatic Advance—32° at 2700 r.p.m.,  
Coil Amps., Engine Idling, 1.9 at 40 m.p.h.  
vacuum advance 12°.  
Timing—10° before top dead center.  
Engine Stopped, 4.

### BATTERY

Amps.—Delco No. 13-N, 90 amp. hr.

### LAMPS

Head—Mazda, No. 2320-C.  
Park—Mazda, No. 63.  
Instrument—Mazda, No. 63.  
Fuse—15 amps.  
Dome—Mazda, No. 81.  
Stop and Tail—Mazda, No. 63.





# Chevrolet Master, 1934

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{5}{8}$ ". Stroke—4".  
Taxable H. P.—26.3.  
Displacement—194 cu. in.  
Firing Order—1-5-3-6-2-4.  
Maximum H. P.—80 at 3,300 r.p.m.

### CAMSHAFT

Drive—Gears, .002" - .004" lash.  
Valve Timing—Marks on gears in line; intake opens  $4^{\circ}$  B. T. C.  
Bearings—3, center, bi-metal.  
End Thrust—Taken on front bearing.  
End Clearance—.003".  
Bearing Clearance—.002" - .0035".

### CONNECTING RODS

End Clearance—.004" - .010".  
Dia. Clearance—.0005" - .002".

### COOLING SYSTEM

Capacity—10½ quarts.  
Pump Drive—Fan belt.  
Belt Size— $2\frac{3}{4}$ " -  $39\frac{1}{8}$ ".  
Belt Adjustment—Generator mounting.  
Pump Packing Adjustment—Thread.

### CRANKSHAFT

No. Bearings—3.  
Material—Bi-metal.  
End Thrust—Taken on center main.  
End Clearance—.004" - .006".  
Dia. Clearance—.001" - .003".

### FUEL SYSTEM

Carburetor Make—Carter,  $1\frac{1}{4}$ ".  
Type—Single, downdraft.  
Adjustment—Idle only;  $\frac{1}{2}$  to 1 turn open.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Combination splash and pump.  
Pump Type—Vane.  
Capacity—5 quarts.  
Oil Pressure—14 lbs. at 30 m.p.h.  
Adjustment—None.  
Winter Oil—  
S. A. E. No. 20.  
Summer Oil—  
S. A. E. No. 30.

### PISTONS

Material—Cast iron, solid skirt.  
Clearance—Top, .011".  
Bottom, .002".

### PISTON RINGS

Gap—.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{1}{8}$ ".

### PISTON PINS

Type—Clamped in rod.  
Fit in Piston—  
Thumb-push fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{4}$ ".  
Stem Dia.—.341".  
Seat Angle— $45^{\circ}$ .  
Seat Width—.062" - .093".  
Clearance—Hot:  
Intake, .006".  
Exhaust, .013".  
Guides Removable?—Yes.  
Spring Pressure—  
45 lbs., valve closed.

## CHASSIS

### FRONT AXLE

Caster— $0^{\circ}$ , wheel center  $\frac{3}{8}$ " behind kingpin center.  
Camber— $1^{\circ}$  to  $2^{\circ}$ , car loaded.  
Toe-in— $\frac{3}{4}$ " to  $\frac{1}{8}$ ".  
Kingpin Angle— $7^{\circ}$ .  
Tie Rod Adjustment—Threaded tie rod ends.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—N. D. 5206, 1105.  
Adjustment—Shims.  
Lash—.004" - .006".  
Differential Bearing Type—N. D.  
Adjustment—Thread.  
Lubricant Capacity Housing— $4\frac{1}{2}$  pints.

### TRANSMISSION

Make and Type—Own, synchromesh.  
Main Shaft Bearing Type and No.—N. D. 3208, 7506.  
Countershaft Bearing Type—Bronze.

### BRAKES

Type—2-shoe mechanical (cable).  
Lining Type—Molded.  
Lining Size— $\frac{1}{4}$ " x  $1\frac{1}{4}$ ".  
Adjustments:  
Anchor Pin—None.  
Shoes—Cam lever and centralizer.  
Clearance:  
Top and Bottom—Slight drag.  
Brake Effort—50/50.

### CLUTCH

Type—Single plate.  
Facing Type—9", molded.  
Pilot Bearing Type and No.—N. D., 7502.  
Throwout Bearing Type—Carbon graphite.

### SPRINGS

Type Front—Coil (independent).  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded rear, rubber front.

### STEERING GEAR

Type—Ball bearing, roller sector.  
Adjustments:  
Worm Shaft—Adjusting nut.  
Cross Shaft—Threaded.  
Gear Mesh—Eccentric sleeve.  
Lubricant—S. A. E. No. 160.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy, No. 734-S.  
Drive—Bendix and starterator.  
Rotation—Clockwise, viewing from drive end.  
No Load—65 amps., 5.0 volts, 5,000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.63 volts.  
Brush Spring Tension—24-28-oz.

### GENERATOR

Make—Delco-Remy, No. 935-B.  
Drive—Fan belt.  
Regulation—Third brush.  
Thermostat—None.  
Output—  
Cold, 19 amps., 8.3 volts, 2,500 r.p.m.  
Hot, 15 amps., 7.9 volts, 2,800 r.p.m.  
Brush Spring Tension—Main brush, 22-26-oz.; third brush, 16-20-oz.  
Rotation—Clockwise, viewing from drive end.  
Cutout to Close—7.2 volts, 7 m.p.h.  
Amps. Discharge to Open—1.  
Field Fuse—None.

### IGNITION

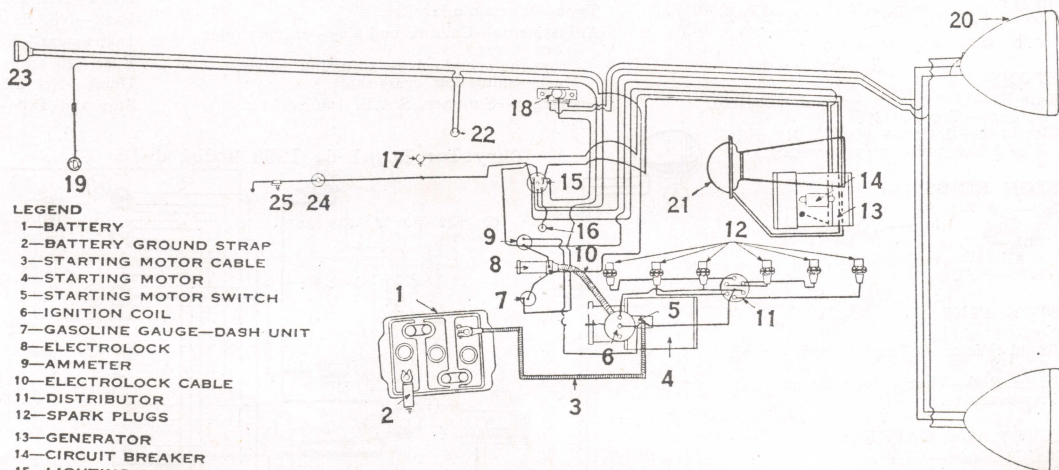
Distributor—Delco-Remy, No. 644-R.  
Coil—Delco-Remy, No. 538-C.  
Distributor Rotation—Clockwise.  
Breaker Gap—.018".  
Brush Spring Tension—17-21-oz.  
Spark Plug Gap—.032".  
Spark Plug Size—14 mm.  
Manual Advance—None.  
Automatic Advance— $36^{\circ}$ .  
Vacuum Advance— $17^{\circ}$ .  
Timing—Points open  $10^{\circ}$  B. T. C.; Neon timing light, motor idling, steel ball in fly-wheel at pointer on housing.  
Coil Amps., Engine Idling, 1.9.  
Stopped, 4.

### BATTERY

Amps.—15-plate, 90 amperes.

### LAMPS

Head—Mazda, No. 2320-C.  
Park—Mazda, No. 63.  
Instrument—Mazda, No. 63.  
Fuse—15 amps.  
Dome—Mazda, No. 81.  
Stop and Tail—Mazda, No. 63.



Chevrolet Master, 1934



# Chrysler Royal 6, 1938

MODEL C-18

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{3}{8}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—27.34.  
Displacement—241.5 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—95 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, all but rear removable.  
End Thrust Taken On—Thrust plate, front end. End play .002"-.006".  
Bearing Clearance—Front, .001"-.003"; all others, .0015"-.0035".

### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

### COOLING SYSTEM

Capacity—5 gals.  
Pump Drive—Fan belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze-backed babbit.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Carter "BB"  $1\frac{1}{4}$ ".  
Type—Downdraft single.  
Adjustment—Idle adjustment,  $\frac{1}{2}$  to  $1\frac{1}{4}$  turns open.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h.; 15 lbs. idling speed.  
Adjustment—Change spring in relief valve.  
Oil { Average temp. 90°F.... S.A.E. 40.  
Average temp. 32°F.... S.A.E. 30.  
Average temp. 10°F.... S.A.E. 20W.  
Average temp. -10°F.... S.A.E. 10W.  
Average temp. -25°F.... S.A.E. 10W.  
plus 10% kerosene.

### PISTONS

Material—U-slot, cam ground, anodized.  
Clearance—Top—.022".  
Clearance—Bottom—.0005"-.001", with 6 to 8 lbs. pull on spring scale.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2, undercut.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2, slotted.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 130° F.  
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{7}{32}$ ".  
Dia. Intake— $1\frac{21}{32}$ ".  
Stem Dia.— $\frac{3}{16}$ ".  
Seat Angle—45°.  
Seat Width—.0635" ( $\frac{1}{16}$ ").  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—.008" { .014" cold  
Exhaust—.010" { for timing.  
Guides Removable—Yes.  
Spring Pressure—40-45 lbs. at  $1\frac{1}{4}$ ".  
101-109 lbs. at  $1\frac{3}{32}$ ".  
Limit of compression,  $1\frac{3}{4}$ ".

## CHASSIS

### FRONT AXLE

Caster— $\frac{1}{2}$ " to  $2\frac{1}{2}$ " (not adjustable).  
Camber— $\frac{1}{4}$ " to  $+\frac{1}{2}$ ";  $+\frac{1}{4}$ " preferred.  
Toe-in—0"-. $\frac{1}{8}$ ";  $\frac{1}{16}$ " preferred.  
Kingpin Angle— $4\frac{3}{4}$ "-6°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw (tension).  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{3}{4}$  pts.

### TRANSMISSION

Make and Type—Helical gear, 3-speed.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Needle roller.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Front shoe,  $11\frac{1}{2}$ " x 2" x  $1\frac{3}{64}$ ";  
rear shoe,  $7\frac{31}{32}$ " x 2" x  $1\frac{3}{64}$ ".  
Hand brake,  $17\frac{1}{16}$ " x 2" x  $\frac{5}{16}$ ".  
Adjustments—Eccentric or cam for clearance.  
Eccentric anchor for each shoe.  
Clearance—Top—.012".  
Bottom—.006".  
Hand brake, .025".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Bushing.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—U—threaded.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft end play—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Summer, S.A.E. 160 or 140.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Solenoid-operated gear.  
Rotation—Clockwise.  
No Load—65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—25 ft. lbs., 4.0 volts, 880 amps.  
Brush Spring Tension—42-53 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Fan belt.  
Regulation—Current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8 volts, 1800 to 2300 r.p.m. and up—on test bench.  
Output, hot—28 amps., 8 volts, 1900 to 2420 r.p.m. and up—on test bench.  
Brush Spring Tension—53 oz. (new brushes).  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts at 9.3 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

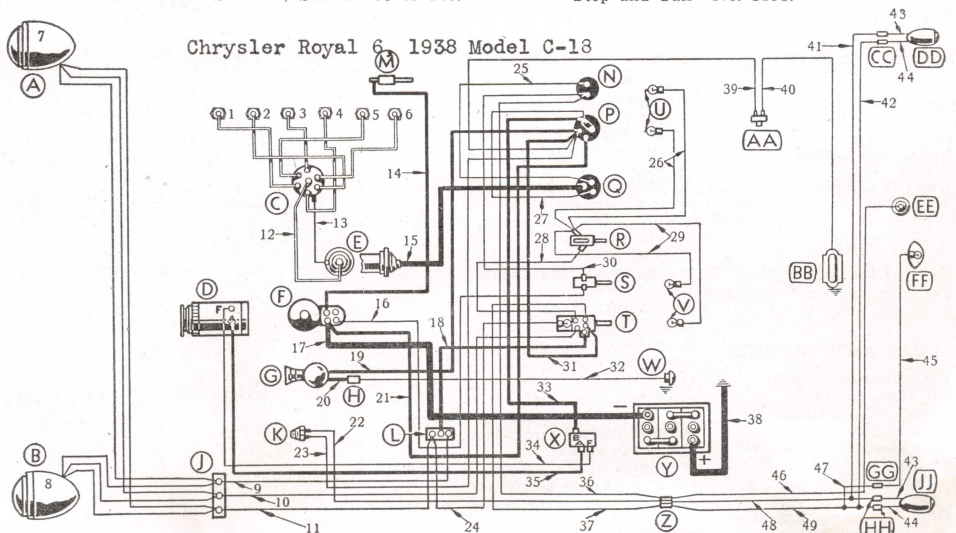
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Sp. Plug Size—Std. head, Champion "J-8"; alum. head, "H-10-14 m/m".  
Manual Advance—None.  
Automatic Advance—24°.  
Vacuum Advance—16°.  
Timing—Standard (iron) head, top dead center. alum. head, .004" piston travel or 3° past top center.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—119 amps.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps., back of ammeter.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Custom Imperial, 1938

## MODEL C-20

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ ".  
Stroke— $4\frac{7}{8}$ ".  
Taxable H. P.—33.80.  
Displacement—323.5 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—130 at 3400 r.p.m.

#### CAMSHAFT

Drive—Chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—Not given.  
End Thrust Taken On—Thrust plate front end. End play, .001"-.008".  
Bearing Clearance—Front, .001"-.0030". All others, .0015"-.0035".

#### CONNECTING RODS

End Clearance—.006"-.011".  
Dia. Clearance—.001"-.003".

#### COOLING SYSTEM

Capacity—5 gals.  
Pump Drive—Fan belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

#### CRANKSHAFT

No Bearings—5.  
Material—Bronze-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Stromberg "AAV-2".  
Type—Dual downdraft.  
Adjustment—Turn clockwise for lean; counter-clockwise for richer mixture.  
Adjustment—A. C. pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h., 15 lbs. idling.  
Adjustment—Change spring in relief valve.  
Average temp. 90°F....S.A.E. 40.  
Average temp. 32°F....S.A.E. 30.  
Average temp. 10°F....S.A.E. 20W.  
Oil { Average temp. -10°F....S.A.E. 10W.  
Average temp. -25°F....S.A.E. 10W.  
plus 10% kerosene.

#### PISTONS

Material—U-slot, cam-ground, anodized.  
Clearance—Top—.022".  
Clearance—Bottom—.0005"-.001", with 5 to 6 pounds push on spring scale.

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2, undercut.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2, slotted.  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 130° F.  
Fit in Rod—Thumb push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{13}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.—.340"-.341".  
Seat Angle—45°.  
Seat Width—.0635" ( $\frac{1}{16}$ ").  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006" (valve timing .011").  
Exhaust—.010" (valve timing .014").  
Guides Removable—Yes.  
Spring Pressure—46-50 lbs. at  $2\frac{1}{32}$ ".  
104-110 lbs. at  $1\frac{11}{16}$ ".  
Limit of compression  $1\frac{1}{2}$ ".

### CHASSIS

#### FRONT AXLE

Caster—1°-3°, not adjustable.  
Camber— $\frac{1}{4}$ ° to  $+\frac{1}{2}$ °;  $+\frac{1}{4}$ ° preferred.  
Toe-in—0"- $\frac{1}{8}$ ";  $\frac{1}{16}$ " preferred.  
Kingpin Angle— $4\frac{3}{4}$ °-6°.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw (tension).  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $6\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear, 3-speed.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Needle roller.

#### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Per shoe,  $14\frac{21}{32}$ " x  $2\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Hand brake,  $21\frac{1}{2}$ " x  $2\frac{1}{2}$ " x  $\frac{9}{16}$ ".  
Adjustments—Eccentric for clearance.  
Eccentric anchor for each shoe.  
Clearance  
Top—.012" } hand brake  
Bottom—.006" } .025".  
Brake Effort—Not given.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Bushing.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded U.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under cover.  
Mesh—cross-shaft adjusting screw.  
Lubricant—Winter, S.A.E. 90.  
Summer, S.A.E. 160 or 140.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Solenoid operated gear.  
Rotation—Clockwise, viewing drive end.  
No Load—65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—25 ft. lbs., 4.0 volts, 880 amps.  
Brush Spring Tension—Not given.

#### GENERATOR

Make—Auto-Lite.  
Drive—Fan belt.  
Regulation—Current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8.0 volts, 1600 to 1800 r.p.m. and up on test bench.  
Output, hot—28 amps., 8.0 volts, 1900 to 2200 r.p.m. and up on test bench.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to close—7.0 volts at 9.1 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

#### IGNITION

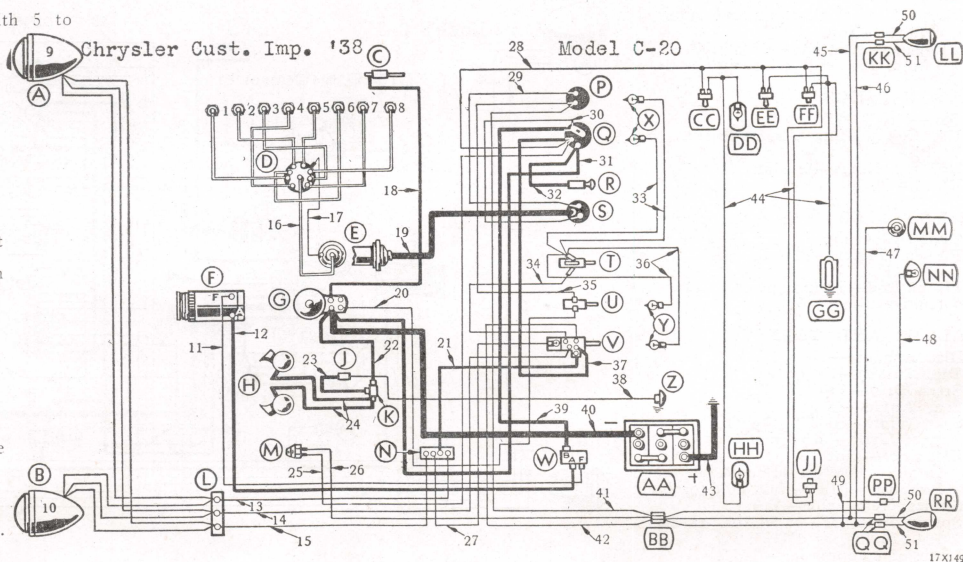
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.018".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Std. head, Champion "J-8"; alum head, "H-10" 14 m/m.  
Manual Advance—None.  
Automatic Advance—24°.  
Vacuum Advance—14°.  
Timing—Alum. head, 6.5 to 1 comp. ratio, top dead center.  
Alum. head, 7.45 to 1 comp. ratio, .038" or 9° past top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

#### BATTERY

Amps.—136 amps.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps. back of ammeter.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Imperial, 1938

MODEL C-19

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—33.8.  
Displacement—298.6 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max H. P.—110 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6.  
End Thrust Taken On—Thrust plate, front end.  
End play—.001"-.008".  
Bearing Clearance—Front .001"-.003"; all others .0015"-.0035".

### CONNECTING RODS

End Clearance—.006"-.011".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity—5 gals.  
Pump Drive—Fan belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Bronze-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "AAV2".  
Type—Dual downdraft.  
Adjustment—Turn clockwise for lean; counter-clockwise for rich mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h.; 15 lbs. idling.  
Adjustment—Change spring in relief valve.

Oil { Average temp. 90°F....S.A.E. 40.  
Average temp. 32°F....S.A.E. 30.  
Average temp. 10°F....S.A.E. 20W.  
Average temp. -10°F....S.A.E. 10W.  
Average temp. 25°F....S.A.E. 10W.  
plus 10% kerosene.

### PISTONS

Material—U-slot, cam-ground, anodized.  
Clearance—Top—.022".  
Clearance—Bottom—.0005"-.001", with 5 to 6 lbs. pull on spring scale.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2, undercut.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2, slotted.  
Width— $\frac{3}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 130° F.  
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{13}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.— $\frac{3}{4}$ "-.341".  
Seat Angle—45°.  
Seat Width—.0635" ( $\frac{1}{16}$ ").  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—.006"-.011" cold for tim'g.  
Exhaust—.010"-.014" cold for tim'g.  
Guides Removable—Yes.  
Spring Pressure—46-50 lbs. at  $2\frac{1}{32}$ ".  
104-110 lbs. at  $1\frac{1}{16}$ ".  
Limit of compression— $1\frac{1}{2}$ ".

## CHASSIS

### FRONT AXLE

Caster— $\frac{1}{2}$ " to  $2\frac{1}{2}$ " (not adjustable).  
Camber— $\frac{1}{4}$ " to  $+\frac{1}{2}$ ";  $+\frac{1}{4}$ " preferred.  
Toe-in— $0\frac{1}{8}$ "- $\frac{1}{16}$ ";  $\frac{1}{16}$ " preferred.  
Kingpin Angle— $43\frac{3}{4}$ °-6°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw (tension).  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{3}{4}$  pts.

### TRANSMISSION

Make and Type—Helical gear, 3-speed.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Needle roller.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Per shoe,  $12\frac{9}{16}$ " x 2" x  $1\frac{3}{4}$ ".  
Hand brake,  $17\frac{1}{16}$ " x 2" x  $\frac{5}{32}$ ".  
Adjustments—Eccentric for clearance.  
Eccentric anchor for each shoe.  
Clearance—Top—.012".  
Bottom—.006".  
Hand brake—.025".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Bushing.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded U.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover. Mesh—cross-craft adjusting screw.  
Lubricant—Summer, S.A.E. 160 or 140.  
Winter, S.A.E. 90.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Solenoid operated gear.  
Rotation—Clockwise, viewing drive end.  
No Load—65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—25 ft. lbs., 4.0 volts, 880 amps.  
Brush Spring Tension—Not given.

### GENERATOR

Make—Auto-Lite.  
Drive—Fan belt.  
Regulation—Current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8 volts., 1600-1800 r.p.m. and up—bench test.  
Output, hot—28 amps., 8 volts, 1900-2200 r.p.m. and up—bench test.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts at 9.1 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

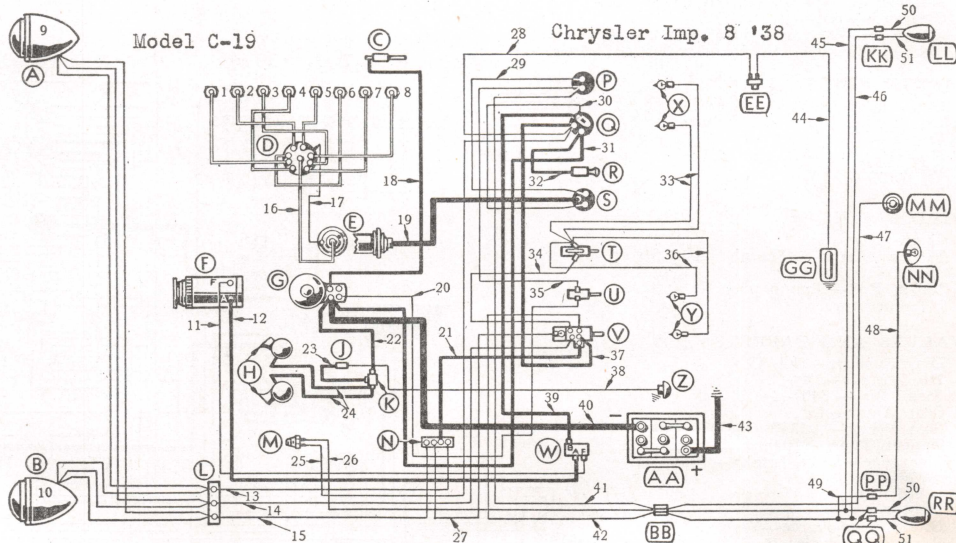
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.018".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Sp. Plug Size—Std. head, Champion "J-8"; alum. head, "H-10", 14 m/m.  
Manual Advance—None.  
Automatic Advance—24°.  
Vacuum Advance—18°.  
Timing—Std. (iron) head, .004", or 3° before top center.  
Alum head, 6.5 to 1 comp. ratio, top dead center.  
Alum head, 7.4 to 1 comp. ratio .004", or 3° after top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—120 amps.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps. back of ammeter.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Royal 6, 1937

## MODEL C-16

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore—3 $\frac{3}{8}$ "  
Stroke—4 $\frac{1}{4}$ "  
Taxable HP.—27.34.  
Displacement—228.1 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. HP.—93 at 3600 r.p.m.

#### CAMSHAFT

Drive—Silent chain.  
Chain Data—48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, replaceable except rear.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—.0015"-.0035".

#### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

#### COOLING SYSTEM

Capacity—5 gal.  
Pump Drive—Belt.  
Belt Size—40° V 48 $\frac{3}{4}$ "x3 $\frac{1}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—4.  
Material—Steel backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Carter B. & B.  
Type—Single down draft.  
Adjustment—Idle,  $\frac{1}{2}$  to  $\frac{1}{4}$  turns open;  
High speed—fixed jets.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30 to 45 lbs. at 30 m.p.h.  
Adjustment—Replace springs in relief valve.  
Oil { 70°—110° F. S. A. E. No. 40.  
40°—110° F. S. A. E. No. 30.  
32°—80° F. S. A. E. No. 20 or 20-W.  
10°—80° F. S. A. E. No. 20-W only.  
-10°—45° F. S. A. E. No. 10-W only.  
-30°—20° F. S. A. E. No. 10-W.  
plus 10% Kerosene.

#### PISTONS

Material—Alum. alloy, anodic finish, U slot.  
Clearance—Top—.022".  
Clearance—Bottom—.002" with 5 to 7 lbs. pull.

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 130° F.  
Fit in Rod—Thumb push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust—1 $\frac{1}{8}$ ".  
Dia. Intake—1 $\frac{1}{8}$ ".  
Stem Dia.—.3405.  
Seat Angle—45°.  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot; Intake—.006".  
Exhaust—.010".  
.014" for valve timing.  
Guides Removable—Yes.  
Spring Pressure—40-45 lbs. at  $\frac{1}{4}$ ";  
101-109 lbs. at 1 $\frac{1}{8}$ ".

### CHASSIS

#### FRONT AXLE

Caster—1 $\frac{1}{4}$ ".  
Camber— $\frac{1}{4}$ " +  $\frac{1}{8}$ " (+  $\frac{1}{4}$  preferred).  
Toe-in—0" -  $\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred).  
Kingpin Angle—4 $\frac{3}{4}$ "-6°.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Draw tension .0015"-.0025".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $\frac{3}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 207 MFG and 207SF.  
Countershaft Bearing Type and No.—Needle bearings.

#### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size—Front 19 $\frac{13}{16}$ "x2"x1 $\frac{3}{4}$ ".  
Rear 17 $\frac{19}{64}$ "x2"x1 $\frac{3}{4}$ ".  
Hand Brake—16 $\frac{19}{16}$ "x2"x $\frac{5}{32}$ ".  
Adjustments—Cam adjustment for lining wear; Eccentric anchor adjustment.  
Clearance—Top—.012".  
Bottom—.006".  
Hand Brake—.025".

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent-U.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover. Cross shaft—adjusting screw. Mesh—shims under side cover.  
Lubricant—Fluid gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Positive shift, foot operated.  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—18 ft. lbs., 670 amps., 4 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Vibrating type current and voltage regulators.  
Thermostat—None.  
Output, cold—22 amps., 8 volts, 1500 r.p.m.  
Output, hot—22 amps., 8 volts, 1900 r.p.m.  
Brush Spr. Tension—18-20 oz.  
Cutout to close—7 volts at 8 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

#### IGNITION

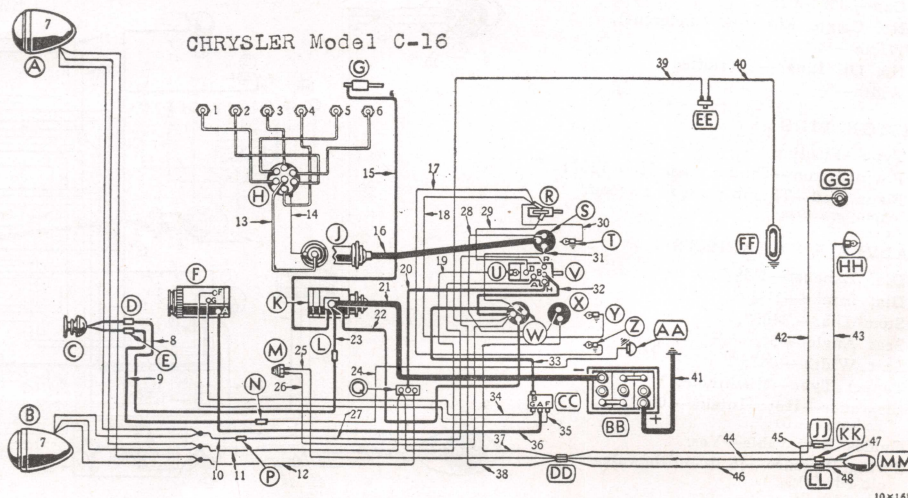
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise viewed from above.  
Breaker Gap—.020".  
Brush Spr. Tension—18-20 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—14 m/m, Champion "J8" for standard head, "H-10" for Aluminum head.  
Manual Advance—None.  
Automatic Adv.—24°.  
Vacuum Adv.—22°.  
Timing—2 degrees or .002" piston travel after top dead center for standard head; Top dead center for Aluminum head.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

#### BATTERY

Amps.—105 amp. hr.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Airflow 8, 1937

MODEL C-17

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{7}{8}$ "  
Taxable HP.—33.8.  
Displacement—323.5 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. HP.—130 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6, steel backed babbitt, except rear.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0015"-.0035".

### CONNECTING RODS

End Clearance—.006"-.011".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity— $4\frac{1}{4}$  gal.  
Pump Drive—Belt.  
Belt Size— $40^{\circ}$ V— $48\frac{3}{4}$ "x $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual down draft.  
Adjustment—Idle adjustment only—Turn in for lean; out for richer mixture.  
Fuel Delivery—Mechanical Pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—30 to 45 lbs. at 30 m.p.h.  
Adjustment—Replace relief valve spring.

Oil  $\left\{ \begin{array}{l} 70^{\circ}-110^{\circ}\text{F. S. A. E. No. 40.} \\ 40^{\circ}-110^{\circ}\text{F. S. A. E. No. 30.} \\ 32^{\circ}-80^{\circ}\text{F. S. A. E. No. 20 or 20-W.} \\ 10^{\circ}-80^{\circ}\text{F. S. A. E. No. 20-W only.} \\ -10^{\circ}-45^{\circ}\text{F. S. A. E. No. 10-W only.} \\ -30^{\circ}-20^{\circ}\text{F. S. A. E. No. 10-W.} \end{array} \right.$   
plus 10% Kerosene.

### PISTONS

Material—Alum. alloy, anodic finish, U-slot.  
Clearance—Top—.022".  
Clearance—Bottom—.002" with 5 to 7 lbs. pull.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at  $130^{\circ}\text{F.}$   
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.—.3405".  
Seat Angle— $45^{\circ}$ .  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006".  
Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure—46 lb.-50 lb. valve closed ( $2\frac{1}{8}$ ".).  
104 lb.-110 lb. valve open ( $1\frac{1}{16}$ ".).

## CHASSIS

### FRONT AXLE

Caster— $1^{\circ}-3^{\circ}$  ( $2^{\circ}$  preferred).  
Camber— $\frac{1}{4}-\frac{3}{4}$ " ( $\frac{1}{2}$ " preferred).  
Toe-in— $0^{\circ}-\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred).  
Kingpin Angle— $4\frac{1}{2}-5\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper Roller.  
Adjustment—Shims.  
End Play—Draw tension, .0015"-.0025".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—4 pts.

### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 208 MFG and 208S.  
Countershaft Bearing Type and No.—Needle bearings.

### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size— $24\frac{27}{32}$ " x  $2^{\circ}$  x  $\frac{1}{4}$ ".  
Hand brake— $21\frac{5}{8}$ " x  $2\frac{1}{2}$ " x  $\frac{3}{16}$ ".  
Adjustments  
Cam adjustment for lining wear.  
Eccentric anchor adjustment.  
Clearance—Top—.012".  
Bottom—.006".  
Hand brake—.025".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent U and rubber.

### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims under lower cover.  
Cross-shaft—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Solenoid positive shift.  
Rotation—Clockwise, facing drive end.  
No Load—65 amps., 5.5 volts, 5300 r. p. m.  
Lock Torque—25 ft. lbs., 880 amps., 4 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Vibrating type current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8.0 volts, 1420 r. p. m.  
Output, hot—28 amps., 8.0 volts, 1700 r. p. m.  
Brush Spring Tension—18-20 oz.  
Rotation—Clockwise, facing drive end.  
Cutout to close—7 volts at 9 m. p. h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

### IGNITION

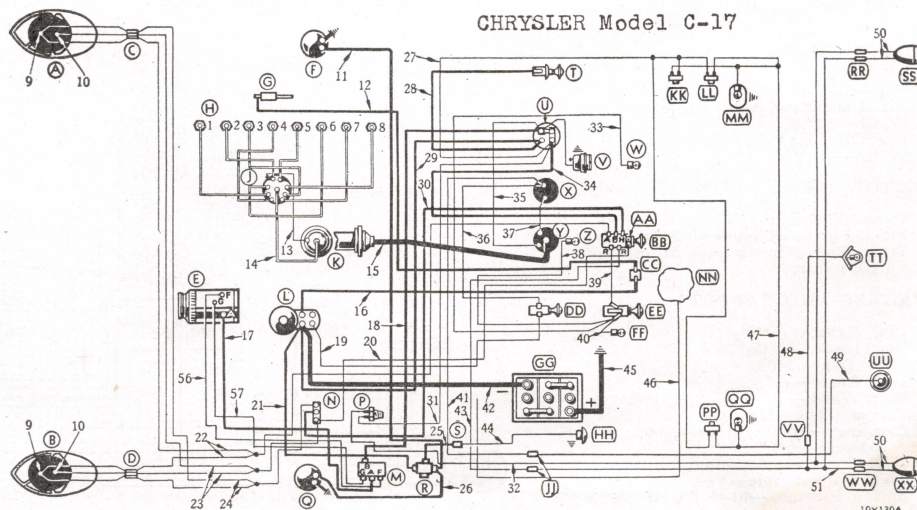
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Dist. Rotation—Clockwise, viewed from above.  
Breaker Gap—.018".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—14 m/m. Champion "H-10."  
Manual Advance—None.  
Automatic Advance— $22^{\circ}$ .  
Vacuum Advance— $14^{\circ}$ .  
Timing—With standard head  $5^{\circ}$  or .012". piston travel past top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—136 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Imperial 8, 1937

## MODEL C-14

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ ".  
Stroke— $4\frac{1}{8}$ ".  
Taxable H. P.—33.8.  
Displacement—273.8 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—110 at 3600 r.p.m.

#### CAMSHAFT

Drive—Chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other in line through shaft centers.  
Bearings—6, steel-backed babbitt except rear.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0015"-.0035".

#### CONNECTING RODS

End Clearance—.006"-.011".  
Dia. Clearance—.001"-.003".

#### COOLING SYSTEM

Capacity— $5\frac{1}{2}$  gals.  
Pump Drive—Belt.  
Belt Size— $40^{\circ}$  V— $48\frac{3}{4}$ " x  $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Downdraft dual.  
Adjustment—Idle Adjustment only. Turn in for lean; out, for richer mixture.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—30 to 45 lbs. at 30 m.p.h.  
Adjustment—Replace spring in relief valve.  
Oil  $\begin{cases} 70^{\circ}\text{--}110^{\circ}\text{ F.} & \text{S.A.E. No. 40} \\ 40^{\circ}\text{--}110^{\circ}\text{ F.} & \text{S.A.E. No. 30} \\ 32^{\circ}\text{--}80^{\circ}\text{ F.} & \text{S.A.E. No. 20 or 20W.} \\ 10^{\circ}\text{--}80^{\circ}\text{ F.} & \text{S.A.E. No. 20W. only} \\ -10^{\circ}\text{--}45^{\circ}\text{ F.} & \text{S.A.E. No. 10W. only} \\ -30^{\circ}\text{--}20^{\circ}\text{ F.} & \text{S.A.E. No. 10W. plus} \\ & 10\% \text{ kerosene.} \end{cases}$

#### PISTONS

Material—Alum. alloy, anodic finish, U-slot.  
Clearance—Top—.022".  
Clearance—Bottom—.022", with 5 to 7 lbs. pull.

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at  $130^{\circ}\text{ F.}$   
Fit in Rod—Thumb push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.—.3405".  
Seat Angle— $45^{\circ}$ .  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006".  
Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure  
46-50 lbs. valve closed ( $2\frac{1}{32}$ ").  
104-110 lbs. valve open ( $11\frac{1}{16}$ ").

### CHASSIS

#### FRONT AXLE

Caster— $1\frac{1}{2}^{\circ}$  preferred.  
Camber— $-.14^{\circ}$ — $+.12^{\circ}$  ( $+.14^{\circ}$  preferred).  
Toe-in— $0^{\circ}$ — $\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred).  
Kingpin Angle— $43\frac{3}{4}^{\circ}$ — $6^{\circ}$ .  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating, Hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Draw tension .0015"-.0025".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 207 MFG and 207 SF.  
—Countershaft Bearing Type and No.—Needle bearings.

#### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{3}{32}$ " x  $2"$  x  $1\frac{3}{64}$ ".  
Hand brake  $16\frac{1}{16}$ " x  $2"$  x  $\frac{5}{32}$ ".

#### Adjustments

Cam adjustment for lining wear.  
Eccentric anchor adjustment.

#### Clearance—Top—.012".

Bottom—.006".  
Hand brake—.025".

#### Brake Effort—Not given.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent-U.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims under lower cover.  
Cross-shaft—adjusting screw.  
Mesh—shims under side cover.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Positive shift, foot operated.  
Rotation—Clockwise, facing drive end.  
No Load—65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—25 ft. lbs., 880 amps., 4 volts.  
Brush Spring Tension—Not given.

#### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Vibrating type current and voltage regulators.  
Thermostat—None.  
Output, cold—28 amps., 8 volts, 1420 r.p.m.  
Output, hot—28 amps., 8 volts, 1700 r.p.m.  
Brush Spring Tension—18-20 oz.  
Rotation—Clockwise, facing drive end.  
Cutout to Close—7 volts at 9 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

#### IGNITION

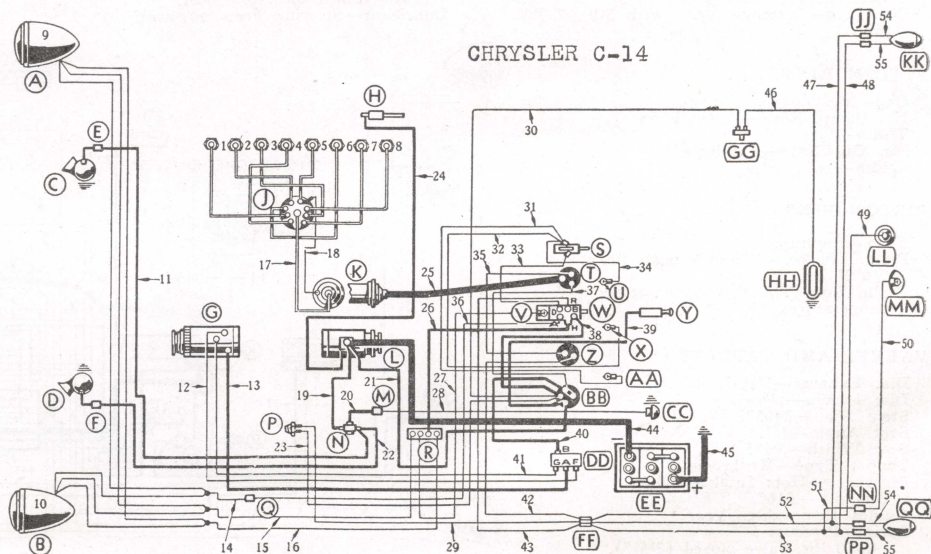
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise, viewed from above.  
Breaker Gap—.018".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Sp. Plug Size—14 m/m, Champion "H-10."  
Manual Advance—None.  
Automatic Advance— $20^{\circ}$ .  
Vacuum Advance— $14^{\circ}$ .  
Timing—3 degrees or .004" piston travel past top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

#### BATTERY

Amps.—119 amp. hr.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Chrysler Custom Imperial 8, 1937

MODEL C-15

## ENGINE

### DATA

No. Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{7}{8}$ "  
Taxable H. P.—33.8.  
Displacement—323.5 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—130 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6, steel-backed babbitt, except rear.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0015"-.0035".

### CONNECTING RODS

End Clearance—.006"-.011".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity— $5\frac{1}{4}$  gals.  
Pump Drive—Belt.  
Belt Size— $40^{\circ}$  V— $48\frac{3}{4}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator adjustment.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual downdraft.  
Adjustment—Idle adjustment only—Turn in for lean; out, for richer mixture.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—34-45 lbs. at 30 m.p.h.  
Adjustment—Replace spring in relief valve.  
Oil {  $70^{\circ}$ - $110^{\circ}$  F. .... S.A.E. No. 40  
       $40^{\circ}$ - $110^{\circ}$  F. .... S.A.E. No. 30  
       $32^{\circ}$ - $80^{\circ}$  F. .... S.A.E. No. 20 or 20W.  
       $10^{\circ}$ - $80^{\circ}$  F. .... S.A.E. No. 20W. only  
       $10^{\circ}$ - $45^{\circ}$  F. .... S.A.E. No. 10W. only  
       $30^{\circ}$ - $20^{\circ}$  F. .... S.A.E. No. 10W. plus  
      10% kerosene.

### PISTONS

Material—Alum. alloy, anodic finish, U-slot.  
Clearance—Top—.022".  
Clearance—Bottom—.002", with 5 to 7 lbs. pull.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ "  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at  $130^{\circ}$  F.  
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{13}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.—.3405".  
Seat Angle— $45^{\circ}$ .  
Seat Width—.0635.  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006".  
              Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure  
      46-50 lbs. valve closed ( $2\frac{1}{32}$ ").  
      104-110 lbs. valve open ( $1\frac{11}{16}$ ").

## CHASSIS

### FRONT AXLE

Caster— $2^{\circ}$  no load.  
Camber— $-\frac{1}{4}^{\circ}$  to  $+\frac{1}{2}^{\circ}$  ( $+\frac{1}{4}^{\circ}$  preferred).  
Toe-in— $0^{\circ}$  to  $\frac{1}{8}^{\circ}$  ( $\frac{1}{16}^{\circ}$  preferred).  
Kingpin Angle— $43\frac{3}{4}^{\circ}$  to  $6^{\circ}$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Draw tension, .0015"-.0025".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $6\frac{1}{4}$  pts.

### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 208 MFG and 208S.  
Countershaft Bearing Type and No.—Needle bearings.

### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size— $24\frac{2}{32}$ " x  $2^{\circ}$  x  $\frac{1}{4}$ ".  
Hand brake  $21\frac{1}{2}$ " x  $2\frac{1}{2}$ " x  $\frac{3}{16}$ ".  
Adjustments  
      Cam adjustment for lining wear.  
      Eccentric anchor adjustment.  
Clearance—Top—.012".  
              Bottom—.006".  
Hand brake—.025".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent-U and rubber.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Solenoid positive shift.  
Rotation—Clockwise, facing drive end.  
No Load—65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—25 ft. lbs., 880 amps., 4 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Vibrating type current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8.0 volts, 1420 r.p.m.  
Output, hot—28 amps., 8.0 volts, 1700 r.p.m.  
Brush Spring Tension—18-20 oz.  
Rotation—Clockwise, facing drive end.  
Cutout to Close—7 volts at 9 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

### IGNITION

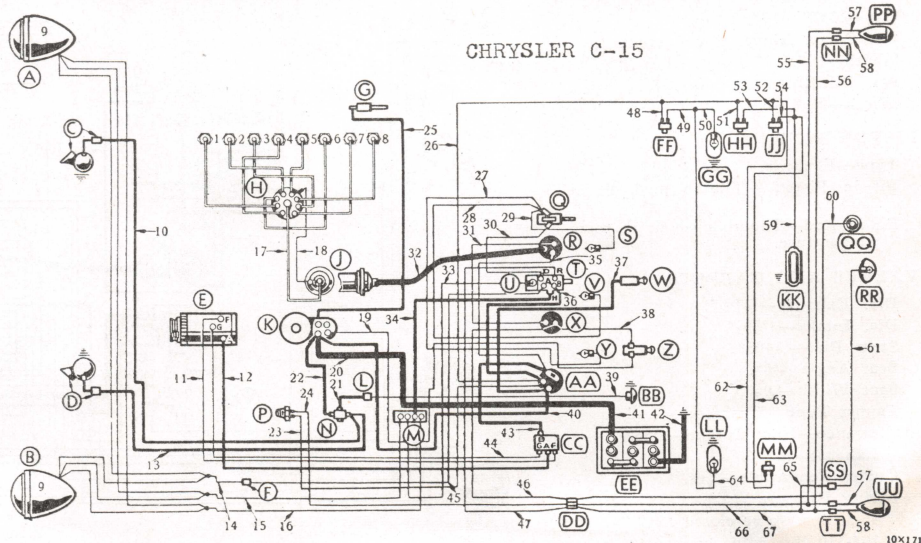
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise, viewed from above.  
Breaker Gap—.018".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spk. Plug Size—14 m/m. Champion "H-10."  
Manual Advance—None.  
Automatic Adv.— $22^{\circ}$ .  
Vacuum Adv.— $14^{\circ}$ .  
Timing—5 degrees or .012" piston travel past top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.— $1\frac{3}{4}$  amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Cord 8, 1937

MODEL 812

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{2}$ ".  
Stroke— $3\frac{3}{4}$ ".  
Taxable H. P.—39.2.  
Displacement—288.64 cu. in.  
Firing Order—1L-3L-4L-2L-2R-1R-3R-4R.  
Max. H. P.—115 at 3800 r. p. m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—58 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—15 links, between marks in sprockets.  
Bearings—5, steel backed babbitt.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—Not specified.

### CONNECTING RODS

End Clearance—.006"-.012".  
Dia. Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—28 qts.  
Pump Drive—Belt.  
Belt Size—V type,  $33\frac{3}{4}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—In fan pulley.  
Pump Pack, Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze babbitt.  
End Thrust Taken On—Center.  
End Clearance—.005"-.010".  
Dia. Clearance—.002"-.0035".

### FUEL SYSTEM

Carburetor Make—Stromberg EE 15.  
Type—Down draft dual.  
Adjustment—Turning idle adjustment out, enriches mixture; in, leans mixture.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—40 lbs. maximum with hot oil.  
Adjustment—Non-adjustable.  
Winter Oil—No. 30 S. A. E.  
Summer Oil—No. 20 W S. A. E.

### PISTONS

Material—Ray-Day alum. alloy.  
Clearance—Top—.026".  
Bottom—.002".

### PISTON RINGS

Gap—.009"-.014".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0002".  
Fit in Rod—.0002".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{3}{64}$ ".  
Dia. Intake— $1\frac{23}{64}$ ".  
Stem Dia.—.3425".  
Seat Angle—Intake 30°, exhaust 45°.  
Tappet Type—Rocker lever.  
Clearance—Hot: Intake—.008"-.010", .016" at valve for timing.  
Exhaust—.008"-.010"; .016" at valve for timing.  
Guides Removable—Yes.  
Spring Pressure—  
57-62 lbs. at  $2\frac{3}{16}$ ".  
118-126 lbs. at  $1\frac{7}{8}$ ".

## CHASSIS

### FRONT AXLE

Caster— $1^{\circ}-2\frac{1}{2}^{\circ}$ , positive.  
Camber— $1^{\circ}$ .  
Toe-out— $0^{\circ}-\frac{1}{8}^{\circ}$  (never in).  
Kingpin Angle— $6^{\circ}$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Dial type. Front drive, spiral bevel.  
Adjustment—Shims.  
End Play—None.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—Transmission and differential, 5 qts.

### TRANSMISSION

Make and Type—Own, helical gear.  
Main Shaft Bearing Type and No.—Ball bearing, MRC 530SG, MRC 2078F.  
Countershaft Bearing Type and No.—Ball bearing, ND 1308.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded on forward, woven on reverse shoe.  
Lining Size—12" moulded, 12" woven x  $2\frac{1}{4}$ " x  $\frac{5}{16}$ ".  
Adjustments—  
Eccentric for centralizing.  
Adjusting screw for clearance.  
Adjustable anchor.  
Clearance, Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Long single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—N. D. 7109.  
Throwout Bearing Type and No.—Bantam No. A 584.

### SPRINGS

Type Front—Transverse, semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber.

### STEERING GEAR

Type—Gemmer worm and roller.  
Adjustments  
Column end play—shims at bottom.  
Cross-shaft end play—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite, MAX 4021.  
Drive—Bendix.  
Rotation—Counter-clockwise, viewing drive end.  
No Load—65 amps., 5.5 volts, 5300 r. p. m.  
Lock Torque—25 ft. lbs., 880 amps., 4 volts.  
Brush Spring Tension—31-42 oz.

### GENERATOR

Make—Auto-Lite, GBR 4603.  
Drive—Belt.  
Regulation—Two-charge current regulator.  
Thermostat—None.  
Output, cold—23 amps., 8.75 volts, 2300 r. p. m.  
Output, hot—20 amps., 8.75 volts, 2500 r. p. m.  
Brush Spring Tension—Worn, 24 oz. min., new 36 oz. max.  
Rotation—Counter-clockwise, viewing drive end.  
Cutout to close—6.5 to 7.2 volts at 9.7 m. p. h.  
Amps. Discharge to Open—.5-2.5.  
Field Fuse—5 amps.

### IGNITION

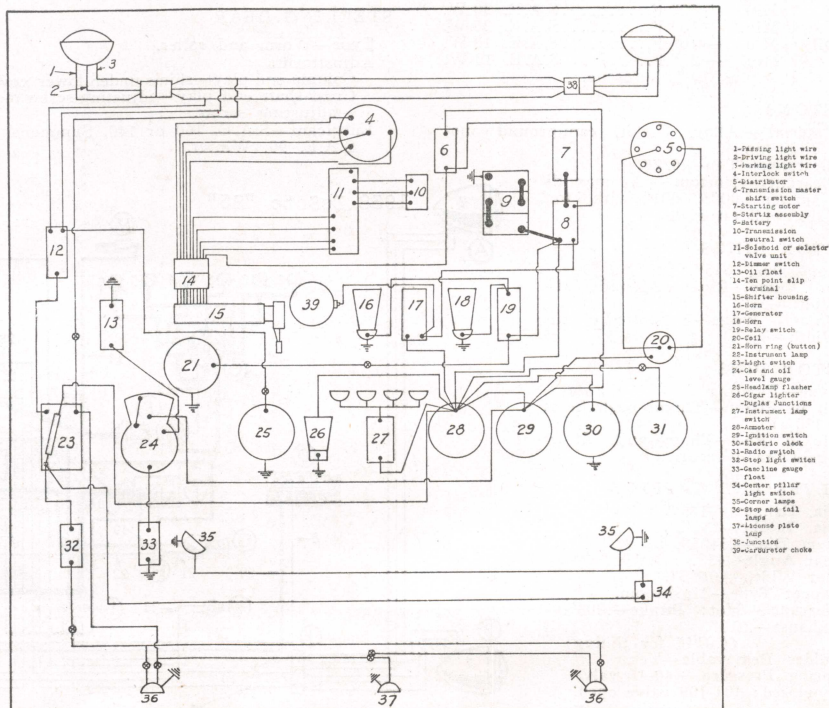
Distributor—Auto-Lite, IGP 4006.  
Coil—Auto-Lite, CE 4620.  
Distr. Rotation—Clockwise.  
Breaker Gap—.013"-.017".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion "J9B," 14 m/m.  
Manual Advance—None.  
Automatic Adv.— $20^{\circ}$ .  
Timing— $3^{\circ}$  before top dead center.  
Coil Amps., Engine Idling—3.5-4.  
Coil Amps., Engine Stopped—5.

### BATTERY

Amps.—10.8 amp. hrs.

### LAMPS

Head—No. 2331.  
Park—No. 63.  
Instrument—No. 63.  
Fuse—20 amps.  
Dome—No. 81.  
Stop and Tail—No. 63.





# De Soto, 1938

MODEL S-5

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{3}{8}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable H. P.—27.34.  
Displacement—228.1 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—Std. head, 93 at 3600 r.p.m.  
Spec. head, 100 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, steel-backed babbitt except rear in case.  
End Thrust Taken On—Thrust plate.  
End play, .002"-.006".  
Bearing Clearance—No. 1, .001"-.003"; all others .0015"-.0035".

### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

### COOLING SYSTEM

Capacity—5 gals.  
Pump Drive—Belt.  
Belt Size—40° V— $43\frac{3}{4}$ " x  $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbitt, precision, removable.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Carter B. & B.  
Type—Downdraft single.  
Adjustment—Idle— $\frac{1}{2}$  to  $1\frac{1}{4}$  turns open;  $\frac{5}{64}$ " float level.  
Fuel Delivery—Mechanical pump, inverted type. Pressure 4 lbs.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h.; 15 lbs. idling speed.  
Adjustment—Relief valve spring replacement.  
Average 90° F. .... S.A.E. No. 40  
Min. + 32° F. .... S.A.E. 30 W.  
Min. + 10° F. .... S.A.E. 20 W.  
Oil { Min. - 10° F. .... S.A.E. 10 W.  
Min. - 25° F. .... S.A.E. 10 W.  
plus 10% kerosene.

### PISTONS

Material—Alloy, U-slot, cam-ground and-dized finish.  
Clearance—Top—.022".  
Clearance—Bottom—At max diameter—.0005"-.001", with 6 to 8 lbs. pull on scale.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb-push fit at 130° F.  
Fit in Rod—Thumb-push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{3}{16}$ ".  
Dia. Intake— $1\frac{1}{2}$ ".  
Stem Dia.—.3405".  
Seat Angle—45°.  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.008".  
Exhaust—.010".  
(.014" for timing)  
Guides Removable—Yes.  
Spring Pressure—40-45 valve closed; 101-109 valve open.

## CHASSIS

### FRONT AXLE

Caster— $\frac{1}{2}$ °-2 $\frac{1}{2}$ °, not adjustable, no load.  
Camber— $-\frac{1}{4}$ ° to +  $\frac{1}{4}$ ° (+  $\frac{1}{4}$ ° preferred), no load.  
Toe-in—0"- $\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred), no load.  
Kingpin Angle—4 $\frac{3}{4}$ °-6°, no load.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" tight.  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Slight drag.  
Lubricant Capacity—Housing— $3\frac{3}{4}$  pts.

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.—Not given.  
Countershaft Bearing Type and No.—Needle.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Front shoe— $11\frac{1}{32}$ "x2"x $1\frac{3}{64}$ ".  
Rear shoe— $7\frac{31}{32}$ "x2"x $1\frac{3}{64}$ ".  
Hand brake— $17\frac{1}{16}$ "x2"x $\frac{3}{32}$ ".  
Adjustments—Eccentric for clearance.  
Eccentric anchor.  
Clearance—Top—.012".  
Bottom—.006".  
Brake Effort—55% front; 45% rear.

### CLUTCH

Type—Single plate, dry, ventilated.  
Facing Type—Asbestos woven and compressed.  
Pilot Bearing Type and No.—Oilite, bronze bushing.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—"U", threaded.

### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end-play—shims under lower cover.  
Cross-shaft end play—adjusting screw mesh—adjusting screw.  
Lubricant—S.A.E. 160 or 140, Summer.  
S.A.E. 90, Winter.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAW 4010.  
Drive—Positive shift, foot operated.  
Rotation—Counter-clockwise, viewed from front of car.  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—18 ft. lbs., 670 amps., 4.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Auto-Lite—GDA—4801-A.  
Drive—Belt.  
Regulation—Vibrator type current and voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8 volts, 2000 r.p.m.  
Output, hot—28 amps., 8 volts, 2500 r.p.m., 22 m.p.h.  
Brush Spring Tension—53 oz. max. new brushes.  
Rotation—Clockwise, viewed from front of car.  
Cutout to Close—7.0 volts at 850 r.p.m., 9.3 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

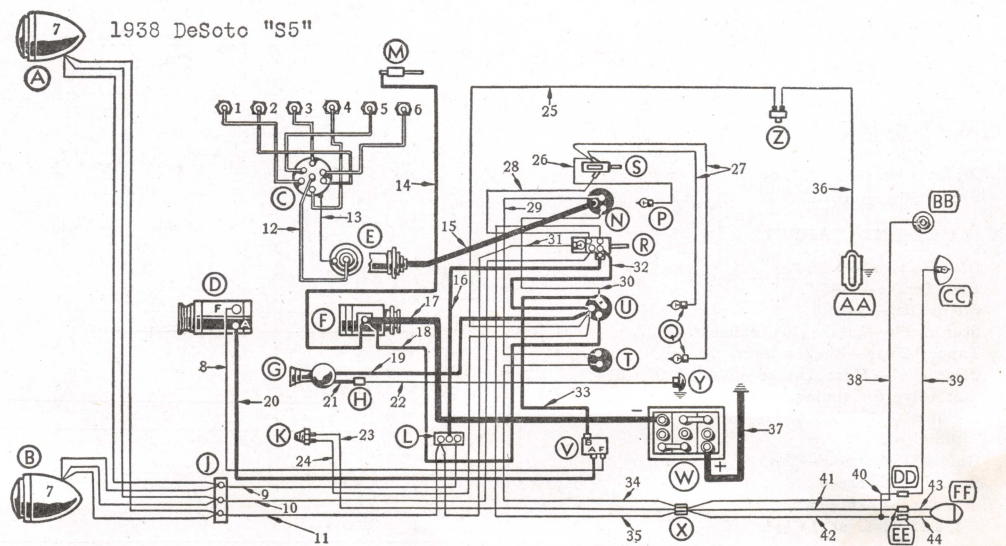
Distributor—Auto-Lite—IGS—4010-C1.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise, viewed from above.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—14 m/m Auto-Lite "H-10" for alum. head; "A-7" for iron head.  
Manual Advance—None.  
Automatic Advance—24° engine.  
Vacuum adv., 14° engine.  
Timing—Cast-iron head—Top dead center.  
Aluminum head—3° after top center.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—Wilard, 105 amp. hour.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# DeSoto, 1937

## MODEL S-3

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable H. P.—27.34.  
Displacement—228.1 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—93 at 3600 r.p.m.

#### CAMSHAFT

Drive—Chain.  
Chain Data—48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, steel-backed babbitt, except front.  
End Thrust Taken On—Thrust plate, front end.  
Bearing Clearance—.0015"-.0035".

#### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

#### COOLING SYSTEM

Capacity—5 gallons.  
Pump Drive—Belt.  
Belt Size— $40^{\circ}$  V-43 $\frac{3}{4}$ "x $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Carter B. & B.  
Type—Down draft single.  
Adjustment—Idle— $\frac{1}{2}$  to  $1\frac{1}{4}$  turn open;  
High speed—fixed jet.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30 to 45 lbs. at 30 m.p.h.  
Adjustment—Replace spring in relief valve.  
Oil { 70°-110° F—S. A. E. No. 40.  
40°-110° F—S. A. E. No. 30.  
32°-80° F—S. A. E. No. 20 or 20-W.  
10°-80° F—S. A. E. No. 20-W only.  
-10°-45° F—S. A. E. No. 10-W only.  
-30°-20° F—S. A. E. No. 10-W, plus  
10% Kerosene.

#### PISTONS

Material—Alum Alloy, anodic surface, U-slot.  
Clearance—Top—.022".  
Clearance—Bottom—.002" with 5 to 7 lbs. pull.

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 130° F.  
Fit in Rod—Thumb push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.—.3405.  
Seat Angle—45°.  
Seat Width—.0635.  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006".  
Exhaust—.010".  
.014" for valve timing.  
Guides Removable—Yes.  
Spring Pressure—40-45 lbs. valve closed.  
101-109 lbs. valve open.

### CHASSIS

#### FRONT AXLE

Caster— $1\frac{1}{2}^{\circ}$  preferred with no load.  
Camber— $-\frac{1}{4}^{\circ}$  to  $+\frac{1}{2}^{\circ}$  (plus  $\frac{1}{4}^{\circ}$  preferred)  
Toe-in—0"- $\frac{1}{8}$ " ( $\frac{1}{16}$  preferred).  
Kingpin Angle— $4\frac{3}{4}^{\circ}$ - $6^{\circ}$ .  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Draw tension .0015"-.0025".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 207 MFG and 207SF.  
Countershaft Bearing Type and No.—Needle bearings.

#### BRAKES

Type—Hydraulic.  
Lining Type—Molded, Front  $19\frac{1}{16}$ "x2"x- $\frac{1}{32}$ ".  
Lining Size—Molded, Rear  $17\frac{1}{16}$ "x2"x- $\frac{1}{32}$ ".  
Adjustments—Cam for lining wear;  
Eccentric anchor adjustment.  
Clearance—Top—.012".  
Bottom—.006".  
Brake Effort—55% front; 45% rear.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent-U.

#### STEERING GEAR

Type—Worm and Roller.  
Adjustments—Column end play—shims under lower cover. Cross shaft—set screw.  
Mesh—shims under side cover.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto Lite.  
Drive—Positive shift, foot operated.  
Rotation—Front of car—counter clockwise  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—18 ft lbs., 670 amps., 4 volts  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—V-Belt.  
Regulation—Vibrating type current and voltage regulators.  
Thermostat—None.  
Output, cold—22 amps., 8 volts, 1500 r.p.m.  
Output, hot—22 amps., 8 volts, 1900 r.p.m.  
Brush Spr. Tension—18 oz.  
Rotation—Front of car—clockwise.  
Cutout to close—7 volts, 8 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

#### IGNITION

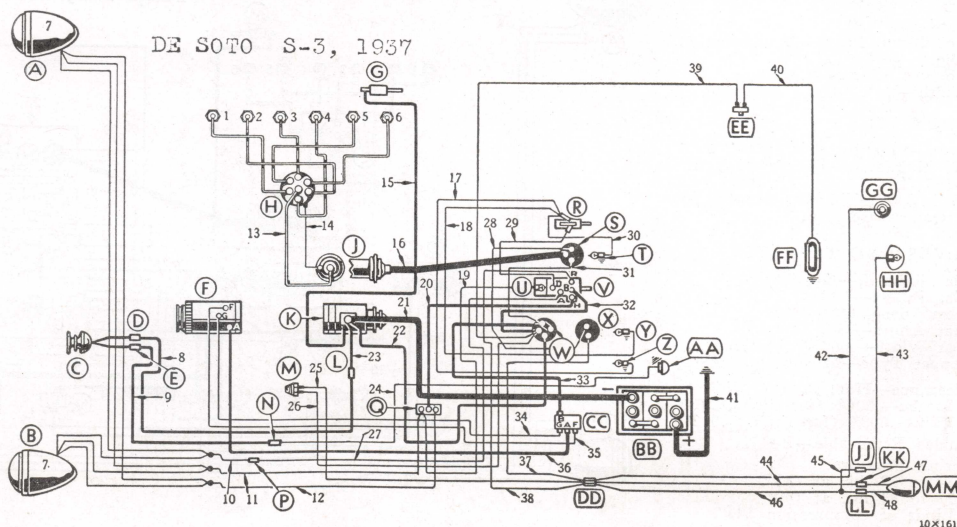
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise viewed from above.  
Breaker Gap—.020".  
Brush Spr. Tension—18-20 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—14 m/m Champion.  
Manual Advance—None.  
Automatic Adv.—24°.  
Vacuum Adv.—22°.  
Timing—2 degrees or .002" piston travel past top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

#### BATTERY

Amps—105 Amp hour.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Dodge D-8, 1938

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—25.35.  
Displacement—217.8 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—87 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—Not given.  
End Thrust Taken On—Thrust plate, front end.  
End play, .002"-.006".  
Bearing Clearance—Front, .001"-.003"; all others .0015"-.0035".

### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

### COOLING SYSTEM

Capacity—15 qts.  
Pump Drive—Fan belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Bronze-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EXV-2,"  $1\frac{1}{4}$ ".  
Type—Downdraft single.  
Adjustment—Turn Idle screw clockwise for lean, and counter-clockwise for richer mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qtss.  
Oil Pressure—30-45 lbs. at 30 m.p.h., 15 lbs. idling.  
Adjustment—Change spring in relief valve.  
Average temp., 90° F....S.A.E. 40  
Average temp., 32° F....S.A.E. 30  
Average temp., 10° F....S.A.E. 20W.  
Oil { Average temp., -10° F....S.A.E. 10W.  
Average temp., -25° F....S.A.E. 10W.  
plus 10% kerosene.

### PISTONS

Material—Split skirt, steel strut.  
Clearance—Top—.022".  
Clearance—Bottom—.0015"-.002" with 7 to 14 lbs. pull on spring scale.

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2, undercut.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2, slotted.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 160° F.  
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.—.340"-.341".  
Seat Angle—45°.  
Seat Width—.0635" ( $\frac{1}{16}$ ".)  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—.006" (for timing .011").  
Exh.—.008" (for timing .012").  
Guides Removable—Yes.  
Spring Pressure  
34 to 38 lbs. at  $1\frac{3}{4}$ ".  
77 to 83 lbs. at  $1\frac{7}{16}$ ".  
Limit of compression  $1\frac{3}{8}$ ".

## CHASSIS

### FRONT AXLE

Caster—1°-3°, 2° preferred.  
Camber— $\frac{1}{4}$ °- $\frac{3}{4}$ °,  $\frac{1}{2}$ ° preferred.  
Toe-in—0"- $\frac{1}{8}$ ",  $\frac{1}{16}$ " preferred.  
Kingpin Angle— $4\frac{1}{2}$ °-5 $\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw (tension).  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pts.

### TRANSMISSION

Make and Type—3-speed, synchro-mesh.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Needle rollers.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Front shoe,  $11\frac{15}{32}$ " x 2" x  $1\frac{3}{4}$ ";  
rear shoe,  $7\frac{1}{32}$ " x 2" x  $1\frac{3}{4}$ ".  
Hand brake,  $1\frac{1}{16}$ " x 2" x  $\frac{5}{32}$ ".  
Adjustments—Eccentric for shoe clearance.  
Eccentric anchor for each shoe.  
Clearance—Top—.012".  
Bottom—.006".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Bushing.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded U.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft end play—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Summer, S.A.E. 160 or 140.  
Winter, S.A.E. 90.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Manually operated solenoid.  
Rotation—Not given.  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—18 ft. lbs., 4.0 volts, 670 amps.  
Brush Spg. Tension—42-53 oz., new brushes.

### GENERATOR

Make—Auto-Lite.  
Drive—Fan belt.  
Regulation—Current and voltage regulation.  
Thermostat—None.  
Output, cold—28 amps., 8 volts, 1800 to 2300 r.p.m. and up on test bench.

Output, hot—28 amps., 8.0 volts, 1900 to 2420 r.p.m. and up on test bench.

Brush Spring Tension—53 oz., new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts, 9.3 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

### IGNITION

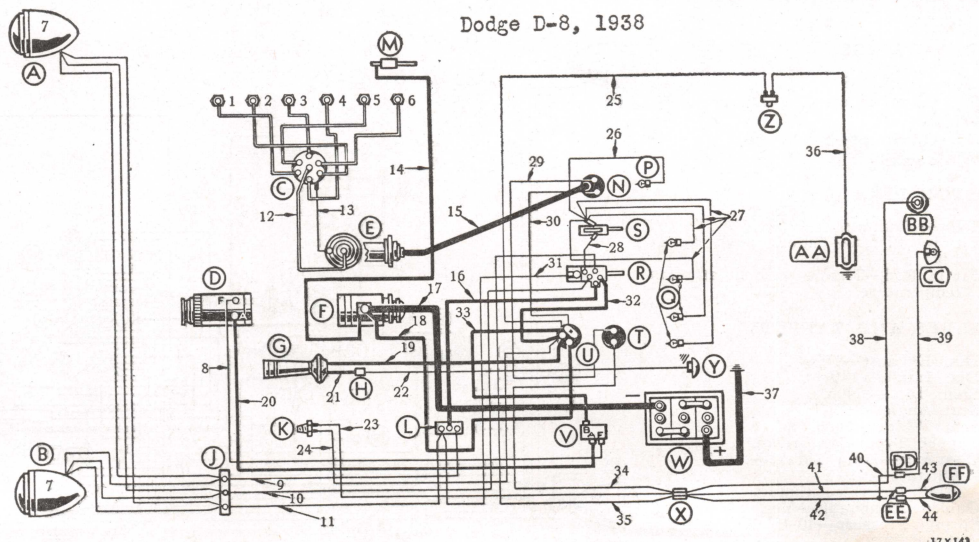
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—18 to 20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion "J-8," 14 m/m.  
Manual Advance—None.  
Automatic Advance—24°.  
Vacuum Advance—18°.  
Timing—.007" or 40° after top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—95 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—Not given.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Dodge, 1937

## MODEL D-5

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{4}$ ".  
Stroke— $4\frac{3}{8}$ ".  
Taxable H. P.—25.35.  
Displacement—217.8 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—87 at 3600 r.p.m.

#### CAMSHAFT

Drive—Chain.  
Chain Data—1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line and opposite each other in line between shaft centers.  
Bearings—4, replaceable except rear.  
End Thrust Taken On—Thrust plate front end; end play .002"-.006".  
Bearing Clearance—.0015"-.0035".

#### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

#### COOLING SYSTEM

Capacity—4 gallons.  
Pump Drive—Belt.  
Belt Size—V-type; proportions not given.  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Downdraft single.  
Adjustment—Turn clockwise for a leaner mixture and counter-clockwise for richer mixture.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30 lbs.-45 lbs. at 30 m.p.h.  
Adjustment—By spring replacement in relief valve.  
Oil—  
Summer—70°-110° S.A.E. No. 40; 40°-110° S.A.E. No. 30.  
Winter—32°-80° S.A.E. No. 20 or No. 20W; 10°-80° S.A.E. No. 20 only; -10°-45° S.A.E. No. 10W only; -30°-20° S.A.E. No. 10 W+10% kerosene.

#### PISTONS

Material—Alum. alloy—steel strut, split skirt.  
Clearance—Top—.022".  
Clearance—Bottom—.0015"-.002", with 7 to 14 lbs. pull on scales.

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut compression).  
Width— $\frac{1}{4}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{3}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Tight thumb push fit at 160° F.  
Fit in Rod—Tight thumb push fit at normal room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.— $\frac{3}{16}$ ".  
Seat Angle—45°.  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006" (.011" valve timing).  
Exhaust—.008" (.012 valve timing).  
Guides Removable—Yes.  
Spring Pressure—34-38 lbs. valve closed; 77-83 lbs. valve open.

### CHASSIS

#### FRONT AXLE

Caster—1°-3° (2° preferred).  
Camber— $\frac{1}{4}$ °- $\frac{3}{4}$ ° ( $\frac{1}{2}$ ° preferred).  
Toe-in—0"- $\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred).  
Kingpin Angle— $4\frac{1}{2}$ °-5 $\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw or tension.  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—MRC 207 SFG and MRC 207 SF.  
Countershaft Bearing Type and No.—Needle bearing.

#### BRAKES

Type—Hydraulic.  
Lining Type—Not specified.  
Lining Size—  
Lining Size—Front,  $19\frac{13}{16}$ " x 2" x  $1\frac{3}{64}$ ".  
Rear,  $17\frac{19}{64}$ " x 2" x  $1\frac{3}{64}$ ".  
Hand Brake,  $16\frac{15}{16}$ " x 2" x  $\frac{9}{32}$ ".  
Adjustments  
Cam adjustment for lining wear.  
Eccentric anchor adjustment.  
Clearance—Top—.012".  
Bottom—.006".  
Hand Brake—.025".  
Brake Effort—Not given.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball bearing.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—U-Thread.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft end play—adjusting screw.  
Mesh—shims under side cover.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Positive shift, foot operated.  
Rotation—Clockwise from drive end.  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—11 $\frac{1}{2}$  ft. lbs., 505 amps., 3.0 volts.  
Brush Spring Tension—42-53 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Voltage and current regulation.  
Thermostat—None.  
Output, cold—22 amperes max.  
Output, hot—Max. 22 amps., 8 volts, at 1480 r.p.m.  
Brush Spring Tension—24-36 oz.  
Rotation—Clockwise from drive end.  
Cutout to Close—6.5 to 7.0 volts.  
Amps. Discharge to Open—2-3.  
Field Fuse—None.

#### IGNITION

Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise viewed from above.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—14 m/m, Champion "J-8."  
Manual Advance—None.  
Automatic Advance—24° at 3500 r.p.m. max.  
Vacuum Advance—18° at 12" mercury, max.  
Timing—4 degrees after top dead center, or .007" piston travel past top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

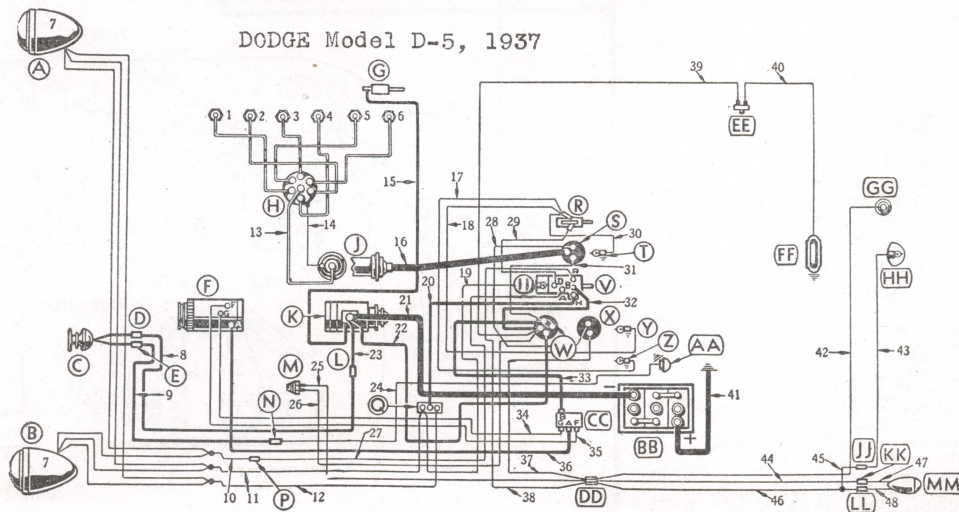
#### BATTERY

Amps.—95 amp. hr.

#### LAMPS

Head—32-32 c. p., No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.

DODGE Model D-5, 1937





# Ford V8, 1938

MODELS 60 and 85

## ENGINE

### DATA

No. of Cylinders—V-60, 8; V-85, 8.  
Bore—V-60, 2.6; V-85,  $3\frac{1}{16}$ ".  
Stroke—V-60, 3.2; V-85,  $3\frac{3}{4}$ ".  
Taxable H. P.—V-60, 21.6; V-85, 30.0.  
Displacement—V-60, 136 cu. in.; V-85, 221 cu. in.  
Firing Order—1-5-4-8-6-3-7-2.  
Max. H. P.—V-60, 60 at 4200 r.p.m.; V-85, 85 at 3800 r.p.m.

### CAMSHAFT

Drive—Gears.  
Chain Data—Not given.  
Valve Timing—Mark on crankshaft gear meshed with mark on camshaft gear.  
Bearings—3, steel-backed babbitt.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.010".  
Dia. Clearance—.002"-.003" (total).

### COOLING SYSTEM

Capacity—V-60, 3.8 gal.; V-85,  $5\frac{1}{2}$  gals.  
Pump Drive—Belt.  
Belt Size—V-60,  $45\frac{3}{4}$ " x  $\frac{5}{8}$ "; V-85,  $51\frac{1}{4}$ " x  $\frac{5}{8}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Steel-backed, special alloy.  
End Thrust Taken On—Rear bearing.  
End Clearance—.002"-.006".  
Dia. Clearance—.0005"-.0025".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE."  
Type—Dual downdraft.  
Adjustment—Idle adjustment, turn in for lean, out for rich mixture.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—V-60, 4 qts.; V-85, 5 qts.  
Oil Pressure—30 lbs. at 30 m.p.h.  
Adjustment—Non-adjustable.  
Oil { Average above 90°..S.A.E. 40  
Min. above 32°..S.A.E. 30  
Min. above 10°..S.A.E. 20 or 20W.  
Min. above -10°..S.A.E. 10 or 10W.  
Lower temperatures....10W. diluted with kerosene.

### PISTONS

Material—Steel, heat-treated.  
Clearance—Top—Not given.  
Clearance—Bottom—V-60, .002"; V-85, .002"; .003 feeler—5 to 10 pull.  
V-85, .002"; .003 feeler—5 to 10 pull.

### PISTON RINGS

Gap—Comp. .009" min.; Oil, .005" min.  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—1.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—V-60, .0002"-.0008"; V-85, .0003"-.0009".  
Fit in Rod—.0002".

### VALVES AND TAPPETS

Dia. Exhaust—V-60, 1.28"; V-85, 1.53".  
Stem Dia.—V-60, .279"; V-85, .311".  
Stem Dia.—V-60, 2.79"; V-85, 3.11".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ " max.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.0125"; .0135" cold.  
Exhaust—.0125" .0135" cold.  
Guides Removable—Yes.  
Spring Pressure—V-60—26-30 lbs. at 2.05"; 45-52 lbs. valve open.  
V-85—35-38 lbs. at 2.13"; 67-72 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster—8°.  
Camber—1°.  
Toe-in— $\frac{1}{4}$ ".  
Kingpin Angle—8°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type— $\frac{3}{4}$  floating spiral bevel.  
Pinion Bearing Type—Timken—799056-799055.  
Adjustment—Screw.  
End Play—Tension 12 to 17 inch pounds.  
Lash—.010".  
Diff. Bearing Type—Timken 799115-799116.  
Adjustment—Non-adjustable.  
End Play—Not given.  
Lubricant Capacity—Housing—2½ pts.

### TRANSMISSION

Make and Type—Own.  
Main Shaft Bearing Type and No.—Fed. 1208CG and 1306CG.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Mechanical four-wheel, cable control.  
Lining Type—Moulded.  
Lining Size— $26\frac{1}{2}$ " x  $1\frac{3}{4}$ " x  $1\frac{1}{4}$ ".  
Adjustments—Adjusting screw operating.  
Adjusting wedge for clearance.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—V-60, woven; V-85, moulded.  
Pilot Bearing Type and No.—Fed. 1203 FO.  
Throwout Bearing Type and No.—Nice 5877.

### SPRINGS

Type Front—Transverse semi-elliptic.  
Type Rear—Transverse semi-elliptic.  
Shackle Adjustment—Oil-less type.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Mesh and cross-shaft end play—adjusting screw side cover.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Own.  
Drive—Bendix.  
Rotation—Counter-clockwise.  
No Load—45-60 amps.  
Lock Torque—14 ft. lbs., 500 amps., 4.8 volts.  
Brush Spring Tension—32-oz.

### GENERATOR

Make—Own.  
Drive—Belt.  
Regulation—3rd brush.  
Thermostat—None.  
Output, cold—18 amps., 6 volts, 1600 r.p.m.  
Output, hot—15 amps.  
Brush Spring Tension—20 oz.  
Rotation—Clockwise.  
Cutout to Close—7.0 volts at 10 m.p.h.  
Amps. Discharge to Open—3.0.  
Field Fuse—None.

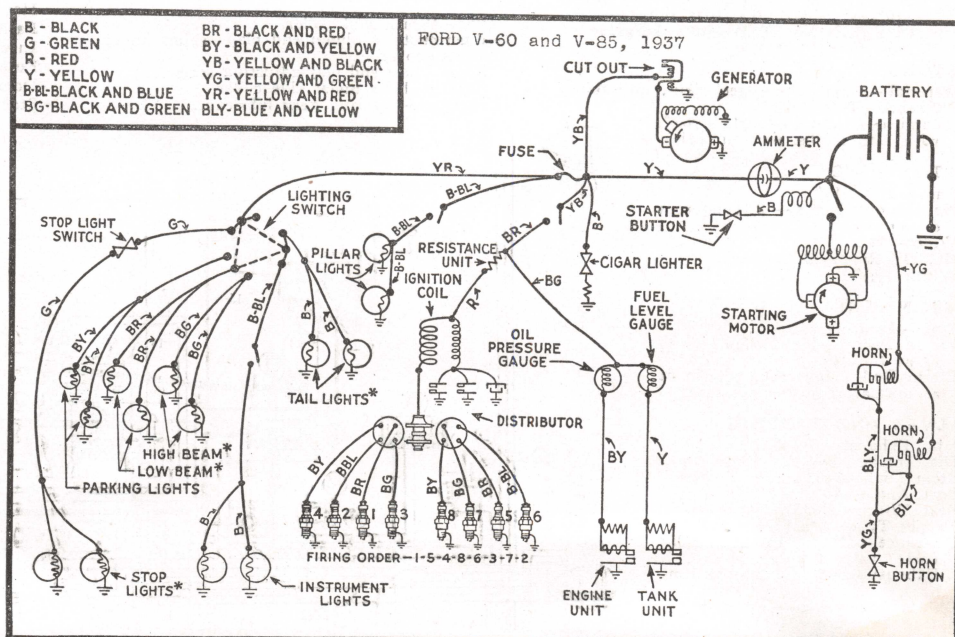
### IGNITION

Coil—Own in distributor.  
Distributor—Own.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.014"-.016".  
Brush Spring Tension—20-24 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—V-60, Champion "H10," 14 m/m; V-85, Champion No. 7, 18 m/m.  
Manual Advance—None.  
Automatic Advance—20°.  
Timing—4° below top dead center, initial advance.  
Coil Amps., Engine Idling—2.8.  
Coil Amps., Engine Stopped—4.0.

### BATTERY

### LAMPS

Amps.—100 amp. hr.  
Head—32-32 c. p.  
Park—1.5 c. p.  
Instrument—3 c. p.  
Fuse—Not specified.  
Dome—3 c. p.  
Stop and Tail—21 c. p. and 3 c. p.





# Ford V-8, 1937

85 and 60 HORSEPOWER

## ENGINE

### DATA

No. of Cylinders—8.  
Bore—3.062"; "60"—2.600".  
Stroke—3.75"; "60"—3.200".  
Taxable H. P.—30.0; "60"—21.63.  
Displacement—221; "60"—136 cu in.  
Firing Order—1-5-4-8-6-3-7-2.  
Max. H. P.—85 at 3800; 60 at 4200 r.p.m.

### CAMSHAFT

Drive—Helical gears.  
Valve Timing—Mark on crankshaft gear tooth meshed at mark on camshaft gear.  
Bearings—3, steel-backed babbit-lined.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.010".  
Dia. Clearance—.003".

### COOLING SYSTEM

Capacity—5½ gal.; "60"—3.80 gal.  
Pump Drive—V-belt.  
Belt Size—V-type—51.2" x 0.63" wide;  
"60"—45.8" long, 0.63" wide.  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3, replaceable.  
Material—Special alloy, steel-backed.  
End Thrust Taken On—Rear main bearing.  
End Clearance—.002"-.006".  
Dia. Clearance—.0005"-.0025".

### FUEL SYSTEM

Carburetor Make—Stromberg, 0.97" venturi;  
"60"—0.81" venturi.  
Type—Dual downdraft.  
Adjustment—Turning out gives a richer mixture; in, a leaner mixture.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.; "60"—4 qts.  
Oil Pressure—30 lbs. at 2600; "60"—30 lbs. at 3200 engine.  
Adjustment—Non-adjustable.  
Oil { Above 90° F. .... S.A.E. 50  
      100° F.-30° F. .... S.A.E. 40  
      65° F.-20° F. .... S.A.E. 30  
      50° F.- 0° F. .... S.A.E. 20 or 20 W  
      30° F.-15° F. .... S.A.E. 10 or 10 W  
      10° F. or lower .... S.A.E. 10W plus 10% kerosene

### PISTONS

Material—Steel alloy, heat treated.  
Clearance—Top—Not specified.  
Clearance Bottom—.003" feeler, 8 to 12 lbs. pull; "60"—.0025" feeler, 8 to 12 lbs. pull.

### PISTON RINGS

Gap—Comp., .009-.015"; oil, .005"-.015".  
No. Comp. Rings—2.  
Width—.0915"-.092".  
No. Oil Rings—1.  
Width—.1545"-.01555".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0003"-.0009"; "60"—.0002"-.0008".  
Fit in Rod—.0002".

### VALVES AND TAPPETS

Dia. Exhaust—1.537"; "60"—1.281".  
Dia. Intake—1.537"; "60"—1.281".  
Stem Dia. —.3105"-.3115"; "60"—.2785"-.2795".  
Seat Angle—45°.  
Seat Width—¾" max.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.013" cold.  
Exhaust—.013" cold.  
Guides Removable—Yes.  
Spring Pressure—35-38 lbs., valve closed—2.13" 65-72 lbs., valve open.  
"60"—26-30 lbs., valve closed—2.05"; 48-52 lbs., valve open.

## CHASSIS

### FRONT AXLE

Caster—9° max., 4½° min.  
Camber—1° max., ¼° min.  
Toe-in—¼".  
Kingpin Angle—8°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—¾ floating spiral bevel.  
Pinion Bearing Type—Taper roller and straight roller.  
Adjustment—Screw.  
End Play—Tension, 12 to 17 inch pounds.  
Lash—.010" max.  
Diff. Bearing Type—Tapered roller.  
Adjustment—Non-adjustable.  
End Play—Not given.  
Lubricant Capacity—Housing—2½-3 pts.

### TRANSMISSION

Make and Type—Own, synchro-mesh, all helical gear; "60"—helical second speed gears.  
Main Shaft Bearing Type and No.—N. D. 43208 and 43306.  
Countershaft Bearing Type and No.—Hyatt 99026.

### BRAKES

Type—4-wheel, mechanical cable operated.  
Lining Type—Semi-moulded.  
Lining Size—26½" x 1¾" x ¾".  
Adjustments—Adjusting screw operating.  
Adjusting wedge for clearance.  
Clearance  
Top—.005" with concentricity gauge.  
Bottom—.005" with concentricity gauge.  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Asbestos moulded.  
Pilot Bearing Type and No.—Prelubricated ball-bearing.  
Throwout Bearing Type and No.—Prelubricated, thrust bearing, Nice 5015-1.

### SPRINGS

Type Rear—Transverse semi-elliptic.  
Type Front—Transverse semi-elliptic.  
Shackle Adjustment—Oil-less type.

### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims under lower cover.  
Cross-shaft—adjusting screw.  
Mesh—adjusting screw at bottom.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Own.  
Drive—Bendix.  
Rotation—Counter-clockwise.  
No Load—45 to 60 amps.  
Lock Torque—14 ft. lbs., 500 amps, 4.8 volts.  
Brush Spring Tension—¾ oz.

### GENERATOR

Make—Own.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—18 amps, 6.2 volts, 1600 r.p.m.  
Output, hot—Max. 15 amps.  
Brush Spring Tension—20 oz.  
Rotation—Clockwise.  
Cutout to Close—7 volts at 10 m.p.h.  
Amps. Discharge to Open—3.0.  
Field Fuse—None.

### IGNITION

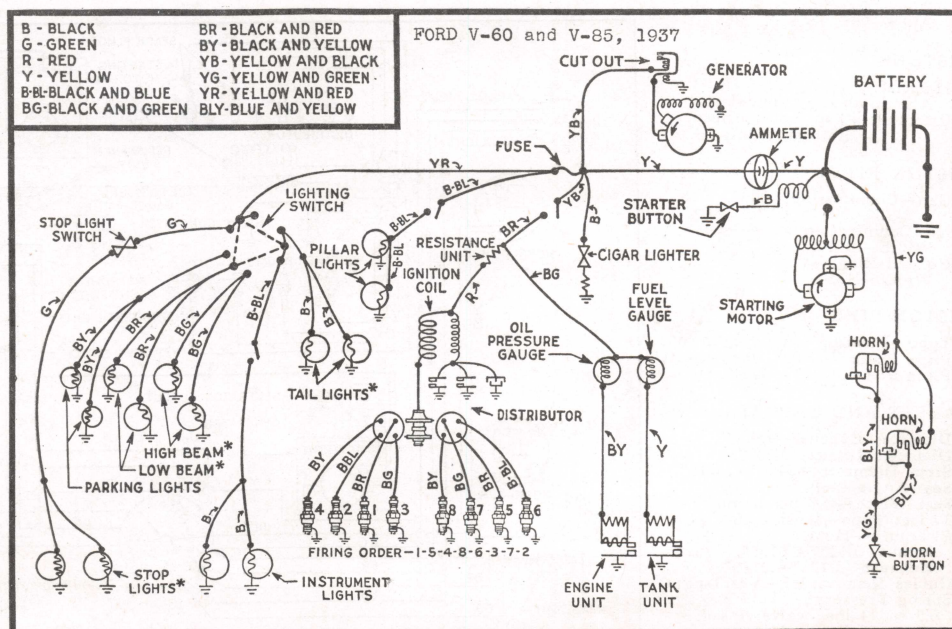
Distributor—Own.  
Coil—Own in distributor.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.014"-.016".  
Brush Spring Tension—20-24 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—18 m/m Champion "7"; "60"—14 m/m Champion "H10".  
Manual Advance—None.  
Automatic Adv.—200 at 3000 engine r.p.m.  
Timing—4° before top dead center, initial advance.  
Coil Amps., Engine Idling—2.8.  
Coil Amps., Engine Stopped—4.0.

### BATTERY

Amps.—100 amp. hrs.

### LAMPS

Head—32-32 C. P.  
Park—1.5 C. P.  
Instrument—3 C. P.  
Fuse—Not specified.  
Dome—3 C. P.  
Stop and Tail—3 C. P. and 21 C. P.





# Ford V-8, 1935

## ENGINE

Taxable H. P.—30.  
DATA

No. of Cylinders—8.  
Bore—3.062" ( $3\frac{1}{8}$ "). Stroke—3 $\frac{3}{4}$ ".  
Displacement—221 cu. in.  
Firing Order—1-5-4-8-6-3-7-2.  
Maximum H. P.—90 at 3800 r.p.m.

### CAMSHAFT

Drive—Gear.  
Chain Data—Crankshaft gear, steel; camshaft gear, Bakelite fabric.  
Valve Timing—Punch mark on camshaft gear in line with tooth marked "Ford."  
Bearings—3.  
End Thrust—Taken on front end.  
Bearing Clearance—.0015" - .0025".

### CONNECTING RODS

Copper lead, floating type.  
End Clearance—.010" - .022".  
Diameter Clearance—.003".

### COOLING SYSTEM

Capacity—5 gallons.  
Pump Drive—Fan belt.  
Belt Size—28° V., 51 $\frac{1}{4}$ " x .63".  
Belt Adjustment—Generator mounting.  
Pump Packing Adjustment—Packless type.

### CRANKSHAFT

No. Bearings—3.  
Material—Babbitt cast in crankcase and cap.  
End Thrust—Taken on rear bearing.  
End Clearance—.002" - .006".  
Diameter Clearance—.001" - .003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual downdraft.  
Adjustment—Idle adjustment only; high speed, fixed jets.  
Fuel Delivery—A. C. mechanical pump.

### LUBRICATION

Type—Pressure-ventilated crankcase.  
Pump Type—Gear.  
Capacity—5 quarts.  
Oil Pressure—30 lbs. at 55 m.p.h.  
Adjustment—Non-adjustable.  
Winter Oil:  
Below 0°, S. A. E. 10 or 10W.  
Below freezing, S. A. E. 20 or 10W.  
Summer Oil:  
Above freezing, S. A. E. 40.  
Above 90°, S. A. E. 50.

### PISTONS

Material:  
Aluminum alloy, split skirt.  
Clearance—Top, not specified.  
Bottom, .002".

### PISTON RINGS

Gap—Compression, .009" - .015".  
Oil—.005" - .009".  
No. Compression Rings—2.  
Width—.092".  
No. Oil Rings—1.  
Width—.155".

### PISTON PINS

Type—Floating (snap-ring in rod).  
Fit in Piston—.0002", piston heated.  
Fit in Rod—.0002" - .0004".

### VALVES AND TAPPETS

Diameter Exhaust—1.537".  
Diameter Intake—1.537".  
Stem Diameter—.3105" - .3115".  
Seat Angle—45°.  
Seat Width— $\frac{3}{8}$ " maximum.  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake, .0125" - .0135".  
Exhaust, .0125" - .0135".  
Guides Removable?—Yes (split).  
Spring Pressure:  
39 to 44 lbs., valve closed.  
62 to 65 lbs., valve open.

## CHASSIS

### FRONT AXLE

Caster—7° loaded.  
Camber—2°.  
Toe-in—.06" ( $\frac{1}{8}$ ").  
Kingpin Angle—7°.  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type— $\frac{3}{4}$ " floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Correct adjustment, 20 to 25 in lbs.  
Lash—.006" - .010".  
Differential Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.001" - .004".  
Lubricant Capacity Housing—2 $\frac{1}{2}$  to 3 pints

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.:  
N.D.-43208 - 43306.  
Countershaft Bearing Type and No.:  
Hyatt, 93324.

### BRAKES

Type—Own, mechanical.  
Lining Type—Semi-molded.  
Lining Size—26 $\frac{1}{2}$ " x 1 $\frac{3}{4}$ " x .185" per wheel.  
Adjustments:  
Adjust cold; adjusting screw on backing plate; linkage adjustment for lever location.  
Clearance—Top, .010".  
Bottom, .010".  
Brake Effort—50/50.

### CLUTCH

Type—Centrifugal, single-plate.  
Facing Type—Molded.  
Pilot Bearing Type and No.—N.D.-7503.  
Throwout Bearing Type and No.:  
Nice, 5015-1.

### SPRINGS

Type Front—Transverse cantilever.  
Type Rear—Transverse cantilever.  
Shackle Adjustment—Oilless.

### STEERING GEAR

Type—Worm and sector.  
Adjustments:  
Column end play, adjusting nut.  
Cross-shaft, adjusting screw.  
Mesh, eccentric.  
Lubricant—Fluid gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Counter-clockwise.  
No Load—Not given.  
Lock Torque—14 ft. lbs., 225 amps., 4.75 volts.  
Brush Spring Tension—32-oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output—Cold, 12 amps. at 25 m.p.h.  
Hot, 10 amps. at 25 m.p.h.  
Brush Spring Tension—20 oz.  
Cutout to Close—7 volts at 10 m.p.h.  
Amps. Discharge to Open—3 amps.

### IGNITION

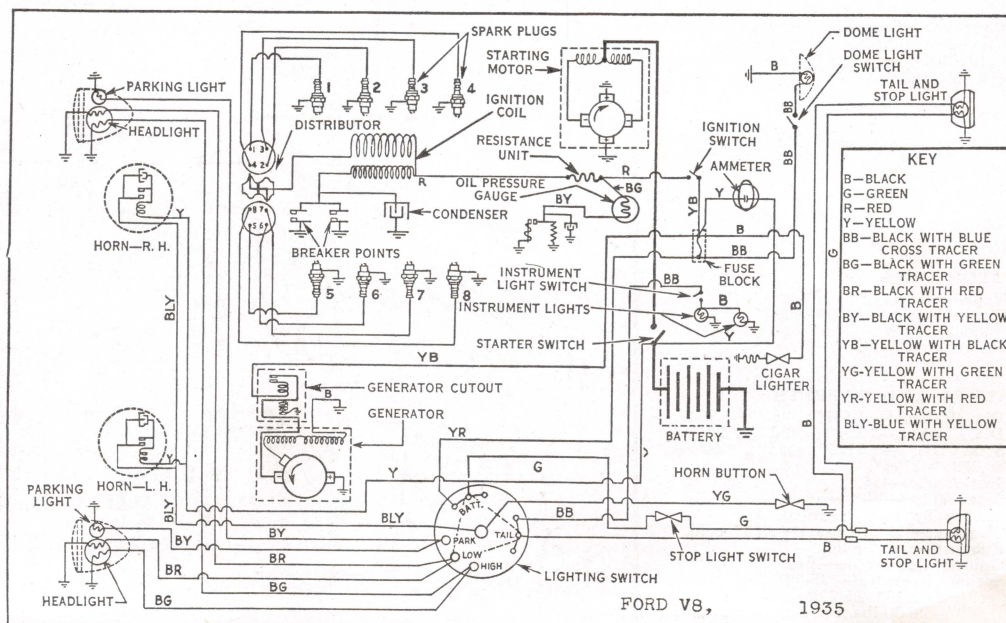
Distributor—Mallory.  
Coil—Mallory.  
Distributor Rotation—Counter-clockwise, viewed from front.  
Breaker Gap—.012" - .014".  
Brush Spring Tension—22-27 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion, M-7, 18 mm.  
Manual Advance—None.  
Automatic Advance—20°, engine at 3000 r.p.m.  
Timing—4° before top dead center.  
Coil Amps., Engine Idling, 2.8.  
Engine Stopped, 4.0.

### BATTERY

96 amp. hour, 17-plate.

### LAMPS

Head—32-32 c.p.  
Park—No. 63.  
Instrument—No. 81.  
Fuse—Not specified.  
Dome—No. 63.  
Stop and Tail—No. 1158.



FORD V8, 1935



# Ford V8, 1934

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{8}$ ". Stroke— $3\frac{3}{4}$ ".  
Taxable H. P.—30.  
Displacement—221 cu. in.  
Firing Order—1-5-4-8-6-3-7-2.  
Maximum H. P.—90 at 3,800 r.p.m.

### CAMSHAFT

Drive—Gear.  
Valve Timing Checked—Timing marks on gears; punch on cam gear in line with tooth marked "Ford."  
Bearings—In crankcase.

### CONNECTING ROD

End Clearance—.010" - .022".  
Diameter Clearance—.003".

### COOLING SYSTEM

Capacity— $5\frac{1}{2}$  gallons.  
Pump Drive—Belt.  
Belt Size—28° Vee,  $\frac{5}{8}$ " wide.  
Belt Adjustment—Generator mounting.  
Pump Packing Adjustment—Nut.

### CRANKSHAFT

No. Bearings—3.  
Material—Babbitt, integral with cap and case.  
End Thrust—Taken on rear.  
End Clearance—.002" - .006".  
Diameter Clearance—.001" - .003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual, downdraft.  
Adjustment—Idle screw; for high speed adjustments, change jets.  
Fuel Delivery—Pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 quarts.  
Oil Pressure—30 lbs. at 55 m.p.h.  
Adjustment—Relief valve opens 30 lbs.  
Winter Oil—S. A. E. No. 10 or No. 20.  
Summer Oil—S. A. E. No. 40 or No. 50.

### PISTONS

Material—Aluminum.  
Clearance—Bottom, .002".

### PISTON RINGS

Gap—Oil Ring, .005" - .009".  
Compression Ring, .009" - .015".  
No. Compression Rings—2.  
Width—.0915" - .092".  
No. Oil Rings—1.  
Width—.1545" - .155".

### PISTON PINS

Type—Floating (snap ring in rod).  
Fit in Piston—.0002".  
Fit in Rod—.0005".

### VALVES AND TAPPETS

Diameter Exhaust—1.537".  
Diameter Intake—1.537".  
Stem Diameter—.3105" - .3115".  
Seat Angle—45°.  
Seat Width— $\frac{3}{8}$ " max.  
Tappet Type—Hollow mushroom.  
Clearance—Hot: Intake, .013".  
Exhaust, .013".  
Guides Removable?—Yes (split).  
Spring Pressure:  
40-42 lbs., valve closed

## CHASSIS

### FRONT AXLE

Caster— $8\frac{3}{4}$ ° loaded.  
Camber—2°.  
Toe-in— $\frac{1}{8}$ ".  
Kingpin Angle—7°.  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type— $\frac{3}{4}$  floating.  
Pinion Bearing Type—Timken.  
Adjustment—Nuts on pinion shaft.  
End Play—Correct adjustment, 20 to 25 inch lbs.  
Lash—.006" - .010".  
Differential Bearing Type—Timken.  
Adjustment—Shims.  
End Play—.001" - .004".  
Lubricant Capacity Housing— $1\frac{1}{2}$  pints.

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.—Fafnir, 306-G.  
Countershaft Bearing Type and No.—Hyatt, 93324.

### BRAKES

Type—Mechanical internal.  
Lining Type—Molded.  
Lining Size— $1\frac{1}{2}$ " x .172".  
Adjustments—Adjust cold; adjusting screw on backing plate.  
Clearance—Top, .010".  
Bottom, .010".

### CLUTCH

Type—Single-plate, dry.  
Facing Type—Molded.  
Pilot Bearing Type and No.—Ball, No. 203.  
Throwout Bearing Type and No.—Nice, No. 5015-Y.

### SPRINGS

Type Front—Transverse cantilever.  
Type Rear—Transverse cantilever.

### STEERING GEAR

Type—Worm and sector.  
Adjustments:  
Worm Shaft—Adjusting nut top of housing.  
Cross Shaft—Adjusting screw.  
Gear Mesh—Eccentric.  
Lubricant—Fluid steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Counter-clockwise.  
Lock Torque—14 ft. lbs., 225 amps., 3 volts  
Brush Spring Tension—2 lbs.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output—Cold, 12 amps., 25 m.p.h.  
Hot, 10 amps., 25 m.p.h.  
Brush Spring Tension—20 oz.  
Cutout to Close—7 volts at 10 m.p.h.  
Amps. Discharge to Open—3.

### IGNITION

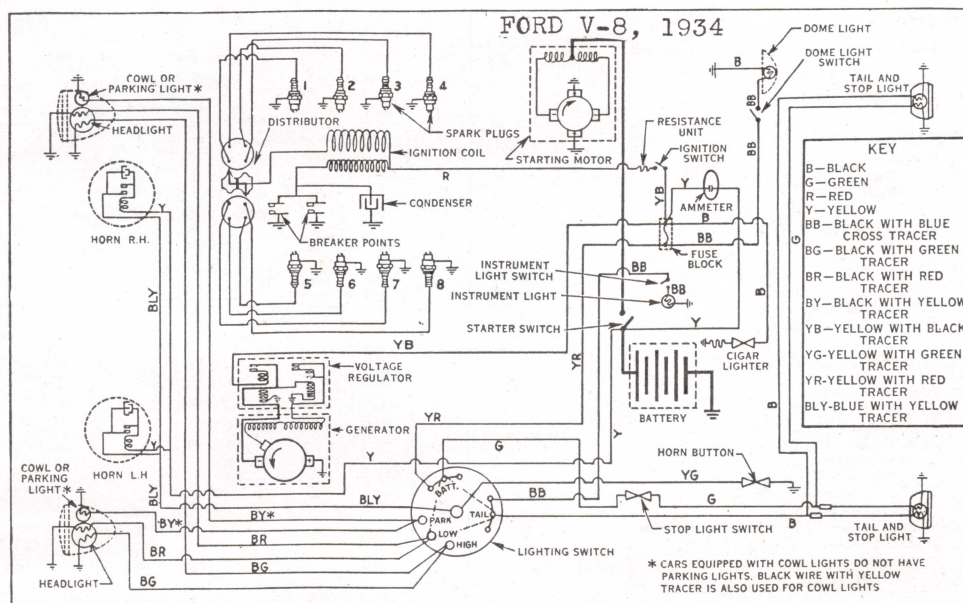
Distributor—Mallory (centrifugal governor, vacuum retard).  
Coil—Mallory.  
Breaker Gap—.012" - .014".  
Brush Spring Tension—22-27 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—18 mm.  
Manual Advance—None.  
Automatic Advance—20° maximum at 3,000 r.p.m.  
Timing—4° before top center.  
Coil Amps., Engine Idling—2.8.  
Engine Stopped, 4.

### BATTERY

Amps.—120 amp. hrs.; 17-plate.

### LAMPS

Head—Mazda, No. 1000.  
Park—Mazda, No. 63.  
Instrument—Mazda, No. 81.  
Dome—Mazda, No. 63.  
Stop and Tail—Mazda, No. 1158.









# Graham Cavalier

SERIES 95, 1937

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{4}$ "  
Stroke—4"  
Taxable H. P.—25.35.  
Displacement—199.1 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—85 at 3300 r.p.m.

### CAMSHAFT

Drive—Linkbelt chain.  
Chain Data—46 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Flywheel mark and exhaust valve opening.  
Bearings—4, steel babbitt lined.  
End Thrust Taken On—Thrust plate.  
Bearing Clearance—.002"-.004".

### CONNECTING RODS

End Clearance—.005".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—15 qts.  
Pump Drive—Belt.  
Belt Size—38" V, 43.3" long,  $1\frac{1}{16}$ " wide.  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel shell, cadmium-silver lining.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.006".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Marvel.  
Type—Downdraft single.  
Adjustment—Turn adjustment out for rich; in, for leaner mixture.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—40 lbs. at 30 m.p.h.  
Adjustment—Shims under relief valve spring.  
Winter Oil—S.A.E. 20W. or 10W.  
Summer Oil—S.A.E. 30 or 40.

### PISTONS

Material—Alum. alloy.—Plated with struts.  
Clearance—Top—.024"-.030".  
Clearance—Bottom—.0025".

### PISTON RINGS

Gap—.007"-.017".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width—Upper  $\frac{3}{16}$ ", Lower  $\frac{5}{32}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0005".  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{3}{16}$ ".  
Stem Dia.— $\frac{5}{16}$ ".  
Seat Angle—Int., 30°; Exh., 45°.  
Seat Width— $\frac{1}{8}$ ".  
Inlet,  $\frac{1}{8}$ "— $\frac{1}{16}$ "; Exh.,  $\frac{5}{64}$ " +  $\frac{1}{64}$ "  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.010".  
Exhaust—.010".  
(.012" for valve timing)  
Guides Removable—Yes.  
Spring Pressure—  
34 lbs. valve closed.  
87 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster—4°-4 $\frac{1}{2}$ ".  
Camber—1°.  
Toe-in— $\frac{1}{8}$ "- $\frac{3}{16}$ ".  
Kingpin Angle—7 $\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating—spiral bevel.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  pts.

### TRANSMISSION

Make and Type—Warner gear—3-speed.  
Main Shaft Bearing Type and No.—Ball No. 1305 CGF.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—18" x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Hand Brake— $17\frac{3}{4}$ " x 2" x  $\frac{9}{32}$ ".  
Adjustments—Cam adjustment for lining wear. Eccentric anchor adjustment.  
Clearance—Top—.005".  
Bottom—.010".  
Hand Brake— $\frac{1}{32}$ ".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Bronze oilite.  
Throwout Bearing Type and No.—Ball BCA No. 4129B.

### SPRINGS

Type Rear—Semi-elliptic.  
Type Front—Semi-elliptic.  
Shackle Adjustment—Rubber cushioned.

### STEERING GEAR

Type—Ross cam and lever.  
Adjustments—Column end play—shims.  
Cross-shaft end play—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy, 738-T.  
Drive—Manual gear, overrunning clutch.  
Rotation—Clockwise viewing drive end.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.63 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy, 948-B.  
Drive—Belt.  
Regulation—Field resistance controlled by lighting switch.  
Thermostat—None.  
Output, cold—21 amps., 8.5 volts, 2400 r.p.m.  
Output, hot—18 amps., 8.3 volts, 2900 r.p.m.  
Brush Spring Tension—Main, 22-26 oz.; Third, 16-20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.75-7.5 volt.  
Amps. Discharge to Open—0-2.5.  
Field Fuse—6 amps.

### IGNITION

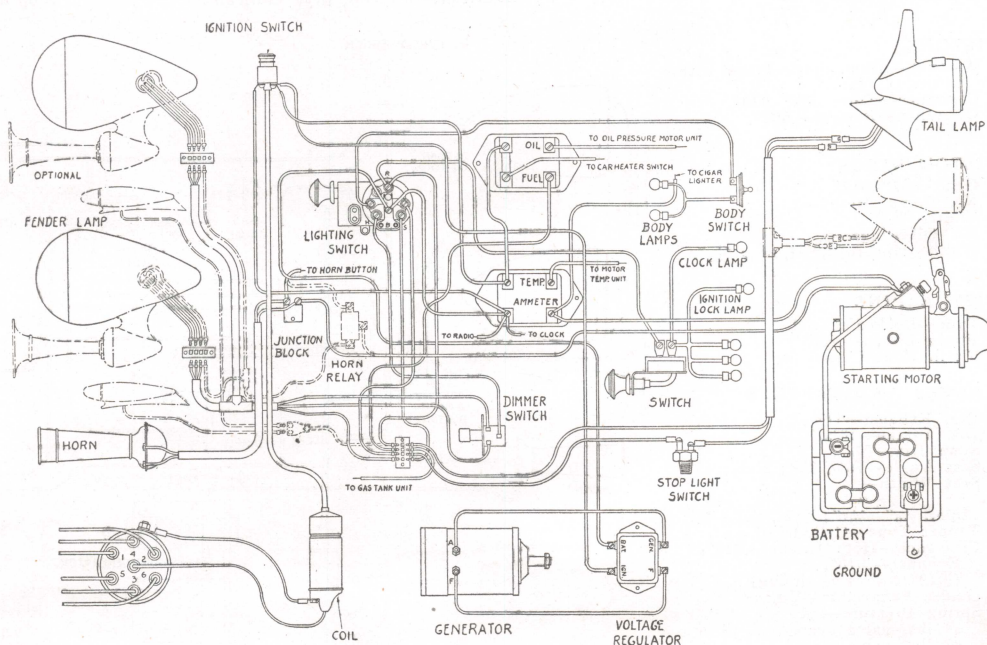
Distributor—Delco-Remy, 623-A.  
Coil—Delco-Remy, 536-J.  
Distr. Rotation—Clockwise viewing drive end of distributor.  
Breaker Gap—.018"-.024".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion J-9, 14 m/m.  
Manual Advance—None.  
Automatic Advance—18° engine at 2800 r.p.m.  
Vacuum Adv.—10°.  
Timing—Top dead center.  
Coil Amps., Engine Idling—1.8.  
Coil Amps., Engine Stopped—3.0.

### BATTERY

Amps.—Willard, 90 amp. hr.

### LAMPS

Head—32-21 C. P.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—Not specified.  
Dome—No. 63.  
Stop and Tail—No. 87 and No. 63.  
Ignition Lock—No. 51.





# Graham Crusader

SERIES 85, 1937

## ENGINE

### DATA

No. of Cylinders—6.  
Bore—3".  
Stroke—4".  
Taxable H. P.—21.6.  
Displacement—169.6 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—70 at 3500 r.p.m.

### CAMSHAFT

Drive—Linkbelt chain.  
Chain Data—46 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Flywheel marks and exhaust valve openings.  
Bearings—4, front and rear replaceable.  
End Thrust Taken On—Thrust plate.  
Bearing Clearance—.002"—.004".

### CONNECTING RODS

End Clearance—.004"—.006".  
Dia. Clearance—.001"—.002".

### COOLING SYSTEM

Capacity—11 qts.  
Pump Drive—Belt.  
Belt Size—38" V—40" long,  $2\frac{1}{32}$ " wide.  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Packless type pump.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel shell—Cadmium silver lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.005".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Marvel.  
Type—Downdraft single.  
Adjustment—Turn adjustment out for rich; in, for leaner mixture.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear  
Capacity—5 qts.  
Oil Pressure—40 lbs. at 30 m.p.h.  
Adjustment—Washer as required under relief valve spring.  
Winter Oil—S.A.E. 20W or 10W.  
Summer Oil—S.A.E.—30 or 40.

### PISTONS

Material—Alum. alloy—Plated with struts.  
Clearance—Top—.024"—.030".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.007"—.012".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2.  
Width—Upper  $\frac{3}{16}$ ", Lower  $\frac{5}{32}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0005".  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{3}{16}$ ".  
Stem Dia.— $\frac{5}{16}$ ".  
Seat Angle—Int., 30°; Exh., 45°.  
Seat Width— $\frac{1}{8}$ ".  
Inlet,  $\frac{1}{16}$ "— $\frac{1}{64}$ "; Exh.,  $\frac{5}{64}$ "— $\frac{1}{64}$ ".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.010".  
Exhaust—.010".  
(.012" for valve timing)  
Guides Removable—Yes.  
Spring Pressure—  
34 lbs. valve open.  
87 lbs. valve closed.

## CHASSIS

### FRONT AXLE

Caster— $4\frac{1}{2}$ °— $5\frac{1}{2}$ °.  
Camber—1°.  
Toe-in— $\frac{1}{8}$ "— $\frac{3}{16}$ ".  
Kingpin Angle— $7\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating spiral bevel.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.004"—.008".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—2 pts.

### TRANSMISSION

Make and Type—Warner gear, 3-speed.  
Main Shaft Bearing Type and No.—No. 1207 and No. 1305 Ball.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—18" x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Cam adjustment for lining wear. Eccentric anchor adjustment.  
Clearance—Top—.010".  
Bottom—.005".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Bronze.  
Throwout Bearing Type and No.—Ball bearing.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber cushioned.

### STEERING GEAR

Type—Ross cam and lever.  
Adjustments—Column end play—shims.  
Cross-shaft end play—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy, 738-V.  
Drive—Manual gear, over-running clutch.  
Rotation—Clockwise viewing drive end.  
No Load—65 amps, 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.63 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy, 937-V.  
Drive—Belt.  
Regulation—Step voltage control.  
Thermostat—None.  
Output, cold—18 amps, 8.3 volts, 2000 r.p.m.  
Output, hot—15 amps., 8.0 volts, 2400 r.p.m.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.4-6.8 volts.  
Amps. Discharge to Open—0.3.  
Field Fuse—6 amps.

### IGNITION

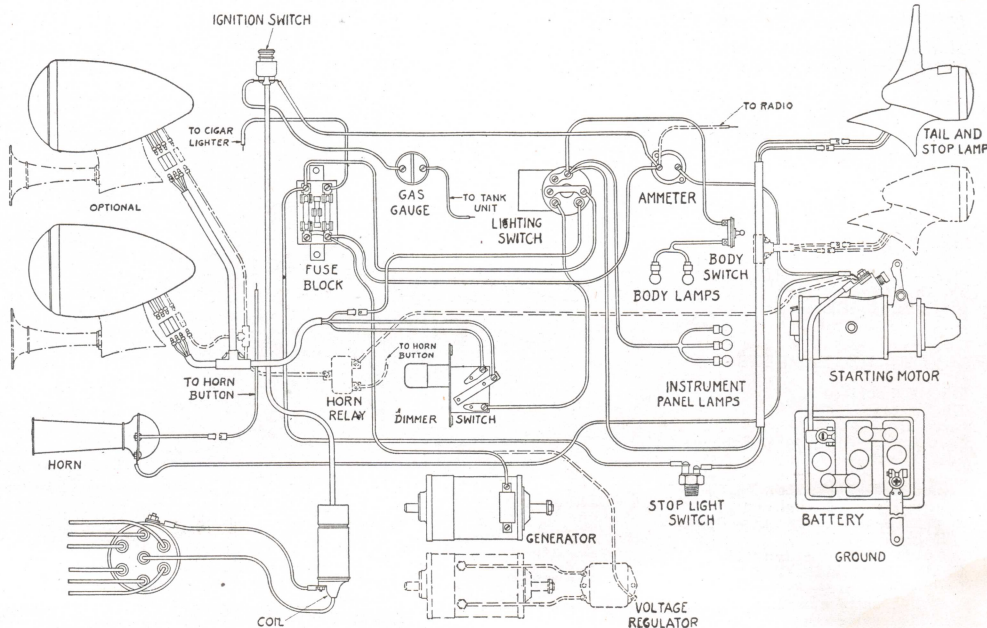
Distributor—Delco-Remy 623-A.  
Coil—Delco-Remy 536-J.  
Distr. Rotation—Clockwise viewing drive end of distributor.  
Breaker Gap—.018"—.024".  
Brush Spr. Tension—17-21 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—Champion, 18 m/m.  
Manual Advance—None.  
Automatic Adv.—18° engine at 2800 r.p.m.  
Vacuum Advance 10°.  
Timing—2 degrees before top center.  
Coil Amps., Engine Idling—1.8.  
Coil Amps., Engine Stopped—3.0.

### BATTERY

Amps.—Willard 90 amp. hr.

### LAMPS

Head—No. 2320 L.  
Park—No. 55.  
Instrument—No. 63.  
Dome—No. 63.  
Stop and Tail—No. 1158 L.









# Hudson, 1938

## MODEL 112

(Starting serial and engine No. 8928566)

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore—3".  
Stroke—4 $\frac{1}{8}$ ".  
Taxable H. P.—21.6.  
Displacement—175.0 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—83 at 4000 r.p.m.

#### CAMSHAFT

Drive—By gear.  
Chain Data—Not given.  
Valve Timing—Marks on gears opposite each other.  
Bearings—3.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.0025".

#### CONNECTING RODS

End Clearance—.006"-.010".  
Dia. Clearance—.001".

#### COOLING SYSTEM

Capacity—12 qts.  
Pump Drive—V-belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack Adjustment—Automatic.

#### CRANKSHAFT

No. Bearings—3, bronze-backed babbitt.  
Material—Not given.  
End Thrust Taken On—Center bearing.  
End Clearance—.006"-.012".  
Dia. Clearance—.001".

#### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Downdraft single.  
Adjustment—Idle,  $\frac{1}{4}$  to 1 turn open.  
Main jet fixed size.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Hudson Duo-Flo automatic.  
Pump Type—Oscillating plunger.  
Capacity—Total 5 $\frac{1}{2}$  qts.; reservoir only 4 $\frac{1}{2}$  qts.  
Oil Pressure—Not given.  
Adjustment—Not given.  
Oil { 50°F. to 110°F...S.A.E. 30.  
      10°F. to 80°F...S.A.E. 20W.  
      -10°F. to 40°F...S.A.E. 10W.  
      -30°F. to +20°F...S.A.E. 10W.  
      + 10% kerosene.

#### PISTONS

Material—Lo-Ex alloy, cam-ground.  
Clearance—Top—.016".  
Clearance—Bottom—.002".

#### PISTON RINGS

Gap—All rings .005".  
No. Comp. Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—2 (one above, one below piston pin).  
Width— $\frac{1}{16}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—.0003" at 200° Fahr.  
Fit in Rod—.00033".

#### VALVES AND TAPPETS

Dia. Exhaust—1 $\frac{1}{8}$ ".  
Dia. Intake—1 $\frac{3}{8}$ ".  
Stem Dia.—11 $\frac{32}{32}$ ".  
Seat Angle—45°.  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Cylindrical.  
Clearance—Hot; Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—44 lbs. at 2".  
102 lbs. at 12 $\frac{1}{32}$ ".

### CHASSIS

#### FRONT AXLE

Caster—2°-2 $\frac{1}{2}$ ° (max. variation right to left  $\frac{1}{2}$ °).  
Camber—1°-1 $\frac{1}{2}$ °.  
Toe-in—At fellow 10" from ground, 0"- $\frac{1}{8}$ ".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shim.  
End Play—.000"-.001".  
Lash—.0005"-.003" (adjustment by shims).  
Diff. Bearing Type—Taper roller.  
Adjustment—Screw.  
End Play—.009" tension.  
Lubricant Capacity—Housing—2 $\frac{3}{4}$  pts. Summer and Winter, S.A.E. 90 E. P.

#### TRANSMISSION

Make and Type—3-speed, helical gear.  
Main Shaft Bearing Type and No.—Ball and roller.  
Countershaft Bearing Type and No.—Steel-backed babbitt.

#### BRAKES

Type—Hydraulic (Bendix).  
Lining Type—Moulded and woven.  
Lining Size—19" x 1 $\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for each shoe.  
Adjusting screw for clearance.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—Not given.

#### CLUTCH

Type—Single disc in oil.  
Facing Type—Cork.  
Pilot Bearing Type and No.—Ball.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semielliptic.  
Shackle Adjustment—Self-adjusting.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments—Wormshaft—shims.  
Cross-shaft—screw gear mesh—adjusting screw.  
Lubricant—Summer and Winter, S.A.E. 90 E. P.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—Not given.  
Lock Torque—12 ft. lbs., 3.0 volts, 550 amps  
Brush Spring Tension—Not given.

#### GENERATOR

Make—Auto-Lite.  
Drive—V-belt.  
Regulation—Third brush (voltage regulation on cars with radio and optional generator.)  
Thermostat—None.  
Output, cold—21 amps. max., 19 amps. min.  
With high output generator, 32 amps. max., 29 amps. min.  
Output, hot—19 amps. max., 17 amps. min.  
With high output generator, 29 amps. max., 26 amps. min.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7.4 volts.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

#### IGNITION

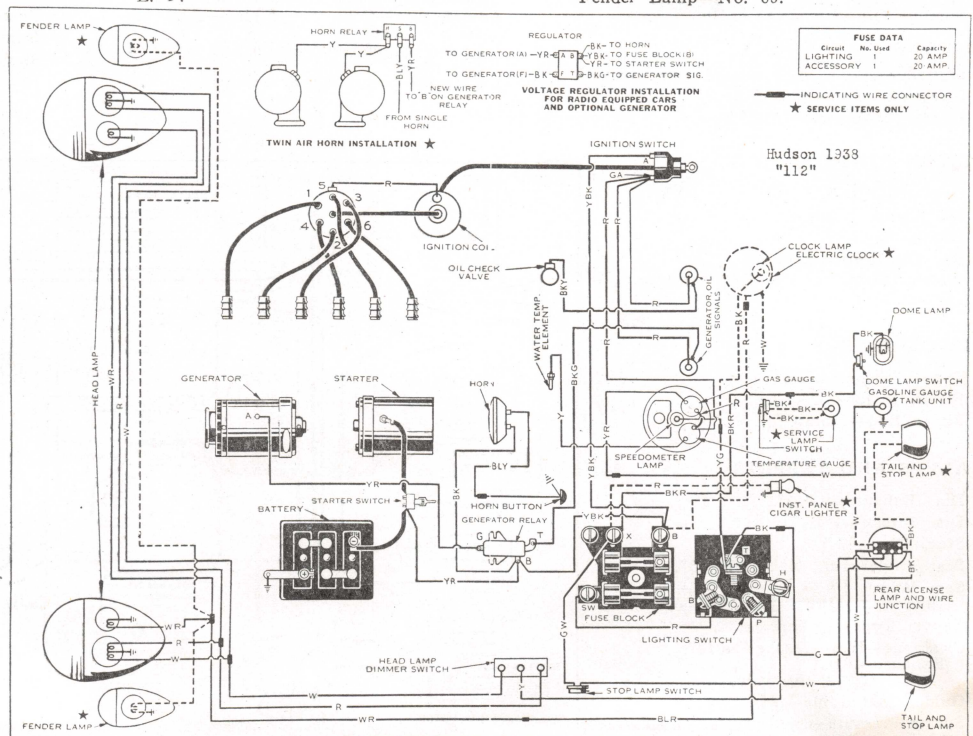
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020" max.  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.032".  
Sp. Plug Size—Champion type 18, 14 m/m.  
Manual Advance—None.  
Automatic Advance—Yes.  
Timing— $\frac{1}{4}$ " before top dead center.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.5 amps.

#### BATTERY

Amps.—17-plate.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps (2 on fuse block).  
Dome—No. 87.  
Stop and Tail—No. 1158.  
License—No. 63.  
Dash Signals—No. 51.  
Fender Lamp—No. 63.





# Hudson 6, 1938

MODEL 83

## ENGINE

### DATA

No. of Cylinders—6.  
Bore—3".  
Stroke—5".  
Taxable H. P.—21.6.  
Displacement—212.0 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—101 at 4000 r.p.m.

### CAMSHAFT

Drive—Gears.  
Chain Data—Not given.  
Valve Timing—Gear marks in mesh.  
Bearings—3.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.0015".

### CONNECTING RODS

End Clearance—.006"-.010".  
Dia. Clearance—.0003"-.0006".

### COOLING SYSTEM

Capacity—12½ qts.  
Pump Drive—Fan belt.  
Belt Size—42°V, 44⅜" x .781".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze-backed babbit.  
End Thrust Taken On—Center bearing.  
End Clearance—.006"-.012".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Carter "WDO"—402S.  
Type—Dual downdraft.  
Adjustment—Idle, ¼-¾ turn open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Splash.  
Pump Type—Oscillating plunger.  
Capacity—Refill 5 qts., dry 6 qts.  
Oil Pressure—3 lbs. normal.  
Adjustment—Non-adjustable.  
Oil { -30°—+20° F. .... S.A.E. 10W., plus  
      -10% kerosene.  
      -10°—+40° F. .... S.A.E. 10W.  
      +10°—+80° F. .... S.A.E. 20W.  
      Above 50° F. .... S.A.E. No. 30.

### PISTONS

Material—Lo-Ex. alum. alloy, cam-ground.  
Clearance—Top—.016".  
Clearance—Bottom—.0005"-.001".

### PISTON RINGS

Gap—All rings .009"-.011".  
No. Comp. Rings—2.  
Width—.093".  
No. Oil Rings—2 (one below piston pin).  
Width—¾₁₆".

### PISTON PINS

Type—Floating.  
Fit in Piston—Selective fit to .0003".  
Fit in Rod—Selective fit to .0003".

### VALVES AND TAPPETS

Dia. Exhaust—1⅜".  
Dia. Intake—1⅜".  
Stem Dia.—.343".  
Seat Angle—45°.  
Seat Width—¼₁₆".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—44 lbs. at 2".  
102 lbs. at 1.656".  
Free length, 2.26" approx.

## CHASSIS

### FRONT AXLE

Caster—2°-3°.  
Camber—1°-1½°.  
Toe-in—0" ⅜".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Timken No. 3199-3120.  
Adjustment—Shims.  
End Play—.000"-.001".  
Lash—.0005"-.0035".  
Diff. Bearing Type—Bower No. 28155-28300.  
Adjustment—Thread.  
End Play—.009" tension.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed.  
Main Shaft Bearing Type and No.—Radial No. 205.  
Countershaft Bearing Type and No.—Bush-ing.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—22⅞" x 1¼" x .218".  
Adjustments—Eccentric for centralizing.  
Notched wheel for clearance.  
Sliding type anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Own, wet disc type.  
Facing Type—Cork.  
Pilot Bearing Type and No.—Radial No. 200.  
Throwout Bearing Type and No.—Special.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent "U," threaded.

### STEERING GEAR

Type—Gemmer worm and roller tooth.  
Adjustments  
Column end play—shims bottom cover.  
Cross-shaft end play—adjusting screw.  
Mesh—through cross-shaft adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAB 4075.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps, 5.5 volts, 3700 r.p.m.  
Lock Torque—22½ ft. lbs., 780 amps, 4.0 volts.  
Brush Spring Tension—46-53 oz., when new.

### GENERATOR

Make—Auto-Lite—GDF 4802A.  
Drive—Fan belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—30.8 amps, 8 volts, 3100 r.p.m.  
Output, hot—28.2 amps, 8 volts, 3200 r.p.m.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7.25 volts at 8.4 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

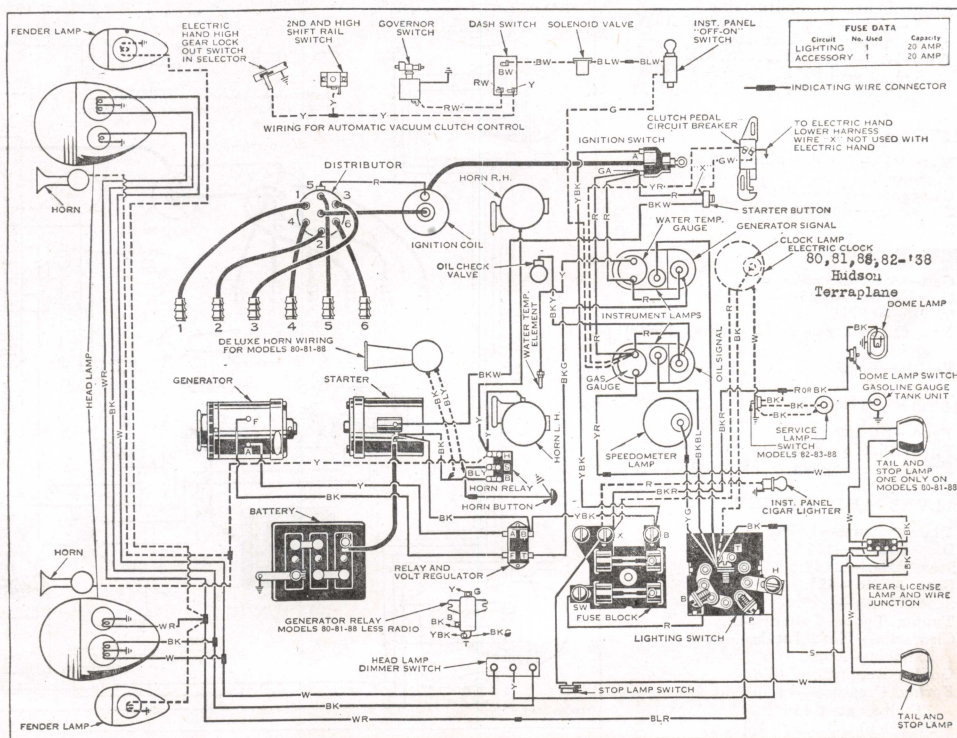
Distributor—Auto-Lite—IGW—4103A.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.032".  
Sp. Plug Size—14 m/m Champion "J-8-A."  
Manual Advance—None.  
Automatic Advance—28° engine.  
Timing—Top dead center.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.5 amps.

### BATTERY

Amps.—96 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Hudson Terraplane, 1938

MODELS 80, 81, 82 and 88

NOTE: Data applies to all models, unless otherwise mentioned

## ENGINE

### DATA

No. of Cylinders—6.  
Bore—3".  
Stroke—5".  
Taxable H. P.—21.6.  
Displacement—212.0 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—96 at 3900 r.p.m.  
"82"—101 at 4000 r.p.m.

### CAMSHAFT

Drive—Gears.  
Chain Data—Not given.  
Valve Timing—Gear marks opposite each other.  
Bearings—3.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.0015".

### CONNECTING RODS

End Clearance—.006"—.010".  
Dia. Clearance—.0003"—.0006".

### COOLING SYSTEM

Capacity—12½ qts.  
Pump Drive—Fan belt.  
Belt Size—42" V, 44⅜" x .781".  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze, babbitt-lined.  
End Thrust Taken On—Center bearing.  
End Clearance—.006"—.012".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Carter "W-1" 397S.  
"82"—Carter "WDO"—402S, dual down-draft.  
Type—Downdraft single.  
Adjustment—Idle, ¼-1 turn open.  
"82"—Idle, ¼-¾ turn open.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Splash.  
Pump Type—Oscillating plunger.  
Capacity—4½ qts. refill, 6 qts. dry.  
Oil Pressure—3 lbs. normal.  
Adjustment—Non-adjustable.  
Oil { -30° +20°F....S.A.E. 10W.,  
plus 10% kerosene.  
-10° +40°F....S.A.E. 10W.  
+10° +80°F....S.A.E. 20W.  
Above +50°F....S.A.E. 30.

### PISTONS

Material—Lo-Ex alum. alloy, cam-ground.  
Clearance—Top—.016"  
Clearance—Bottom—.0005"—.001".

### PISTON RINGS

Gap—All rings .009"—.011".  
No. Comp. Rings—2.  
Width—.0933".  
No. Oil Rings—2 (1 below piston pin).  
Width—⅜".

### PISTON PINS

Type—Floating.  
Fit in Piston—Selective fit to .0003".  
Fit in Rod—Selective fit to .0003".

### VALVES AND TAPPETS

Dia. Exhaust—1⅜".  
Dia. Intake—1⅜".  
Stem Dia.—.343".  
Seat Angle—45°.  
Seat Width—⅜".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—44 lbs. at 2".  
102 lbs. at 1.656".  
Free length, 2.26" approx.

## CHASSIS

### FRONT AXLE

Caster—2°-3°.  
Camber—1°-1½".  
Toe-in—0"-⅜".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Timken No. 3199-3120.  
Adjustment—Shims.  
End Play—.000"—.001".  
Lash—.0005"—.0035".  
Diff. Bearing Type—Bower No. 28155-28300.  
Adjustment—Thread.  
End Play—.009" tension.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed.  
Main Shaft Bearing Type and No.—Radial No. 205.  
Countershaft Bearing Type and No.—Bushings.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—22½" x 1¼" x .218".  
Adjustments—Eccentric for centralizing.  
Sliding wheel anchor.  
Notched wheel for clearance.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Own, int. type disc.  
Facing Type—Cork.  
Pilot Bearing Type and No.—Radial No. 200.  
Throwout Bearing Type and No.—Special.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent "U," threaded.

### STEERING GEAR

Type—Gemmer worm and roller tooth.  
Adjustments  
Column end play—shim bottom cover  
Cross-shaft end play—adjusting screw mesh  
—through cross-shaft adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAB 4075.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque—22½ ft. lbs., 780 amps., 4.0 volts.  
Brush Spring Tension—46-53 oz. when new.

### GENERATOR

Make—Auto-Lite—  
m/80-81—GDF—4803A-1 without radio.  
m/80-81—GDF—4802A with radio.  
m/88—GDF 4802A.  
"82"—Auto-Lite—GDF 4802-A.  
Drive—Belt.  
Regulation—3rd brush; voltage regulator with radio.  
Thermostat—None.  
Output, cold—18 amps., 8 volts, 2800 r.p.m.  
"82"—30.8 amps., 8 volts, 3100 r.p.m.  
Output, hot—17 amps., 8 volts, 2800 r.p.m.  
"82"—28.2 amps., 8 volts, 3200 r.p.m.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7.25 volts at 8.4 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

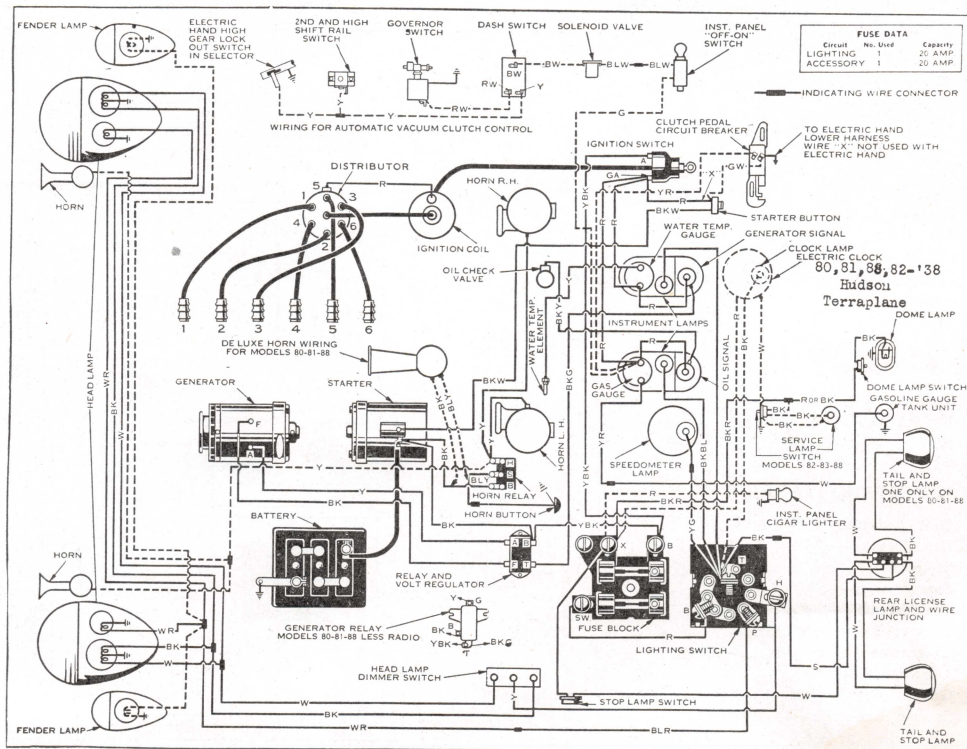
Distributor—Auto-Lite—  
IGW—4012A without radio.  
IGW—4104A with radio.  
"82"—Auto-Lite—IGW—4103A.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.032".  
Spark Plug Size—14 m/m Champion "J-8-A."  
Manual Advance—None.  
Automatic Adv.—28° engine.  
Timing—Top dead center.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.5 amps.

### BATTERY

Amps.—96 amp. hour.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Hudson Eight, 1938

MODELS 84, 85, and 87

## ENGINE

### DATA

No. of Cylinders—8.  
Bore—3.000".  
Stroke—4½".  
Taxable H. P.—28.8.  
Displacement—254.47 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—122 at 4200 r.p.m.

### CAMSHAFT

Drive—Gears.  
Chain Data—Not given.  
Valve Timing—Gear marks in mesh.  
Bearings—5.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.0015".

### CONNECTING RODS

End Clearance—.006"-.010".  
Dia. Clearance—.0003"-.0006".

### COOLING SYSTEM

Capacity—17.2 qts.  
Pump Drive—Belt.  
Belt Size—42° V, 44⅜" x .781".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Bronze-backed babbitt.  
End Thrust Taken On—Center bearing.  
End Clearance—.006"-.012".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Carter "WDO" 402S.  
Type—Dual downdraft.  
Adjustment—Idle, ¼-¾ turn open.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Splash.  
Pump Type—Oscillating plunger.  
Capacity—Refill 7 qts., dry 9 qts.  
Oil Pressure—3 lbs. normal.  
Adjustment—Non-adjustable.  
Oil { 30°-+20°F.....S.A.E. 10W.  
plus 10% kerosene.  
-10°-+40°F.....S.A.E. 10W.  
+10°-+80°F.....S.A.E. 20W.  
Above +50°F.....S.A.E. 30

### PISTONS

Material—Lo-Ex alum. alloy, cam-ground.  
Clearance—Top—.016".  
Clearance—Bottom—.0005"-.001".

### PISTON RINGS

Gap—All rings .009"-.011".  
No. Comp. Rings—2.  
Width—.093".  
No. Oil Rings—2 (one below piston pin).  
Width—⅜".

### PISTON PINS

Type—Floating.  
Fit in Piston—Selective fit to .0003".  
Fit in Rod—Not specified.

### VALVES AND TAPPETS

Dia. Exhaust—1⅜".  
Dia. Intake—1½".  
Stem Dia.—.343".  
Seat Angle—45°.  
Seat Width—⅛".  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—44 lbs. at 2".  
102 lbs. at 1.656".  
Free length, 2.26" approx.

## CHASSIS

### FRONT AXLE

Caster—2°-3°.  
Camber—1°-1½°.  
Toe-in—0"½".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Timken No. 3199 and No. 3120.  
Adjustment—Shims.  
End Play—.000"-.001".  
Lash—.0005"-.0035".  
Diff. Bearing Type—Bower 28155-28300.  
Adjustment—Thread.  
End Play—.000"-.001".  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed.  
Main Shaft Bearing Type and No.—Radial No. 205.  
Countershaft Bearing Type and No.—Special.

### BRAKES

Type—Bendix two-shoe hydraulic.  
Lining Type—Moulded.  
Lining Size—23½" x 1¼" x .218".  
Adjustments—Eccentric for centralizing.  
Notched wheel for clearance.  
Sliding type anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Own, int. disc type.  
Facing Type—Cork.  
Pilot Bearing Type and No.—Radial No. 200.  
Throwout Bearing Type and No.—Special.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent "U," threaded.

### STEERING GEAR

Type—Gemmer worm and roller tooth.  
Adjustments  
Column end play—shims under lower cover.  
Cross-shaft end play—adjusting screw mesh—cross-shaft adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite, MAB—4075.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque—22½ ft. lbs., 780 amps., 4.0 volts.  
Brush Spring Tension—46-53 oz., new brushes.

### GENERATOR

Make—Auto-Lite, GDF—4802A.  
Drive—Belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—30.8 amps., 8.0 volts, 3100 r.p.m.  
Output, hot—28.2 amps., 8.0 volts, 3100 r.p.m.  
Brush Spring Tension—23-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7.25 volts at 8.4 m.p.h.  
Amps. Discharge to Open—2.0 amps.  
Field Fuse—None.

### IGNITION

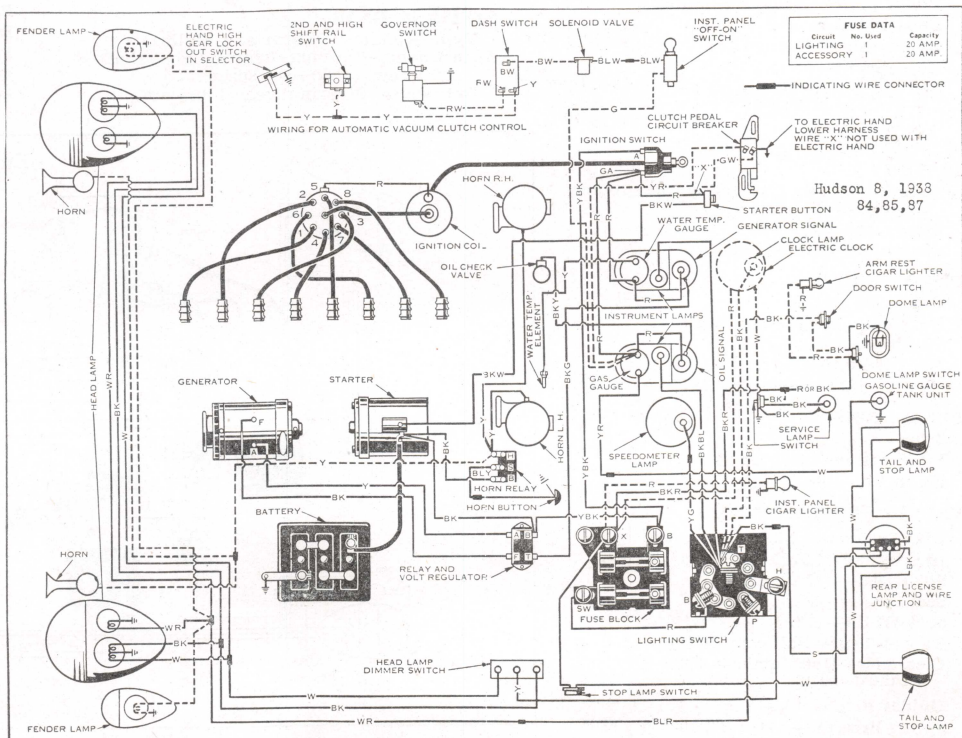
Distributor—Auto-Lite, IGP—4008A.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.017".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.032".  
Spark Plug Size—14 m/m Champion "J-8-A."  
Manual Advance—None.  
Automatic Advance—35° engine.  
Timing—Top dead center.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps., Engine Stopped—4.5 amps.

### BATTERY

Amps.—108 amp. hour.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Hudson Six

MODEL 73, 1937

## ENGINE

### DATA

No. of Cylinders—6.  
Bore—3".  
Stroke—5".  
Taxable HP.—21.6.  
Displacement—212 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max HP.—101 @ 4000. Super power dome head 107 @ 4000.

### CAMSHAFT

Drive—Gears.  
Chain Data—  
Valve Timing—Punch marks opposite each other.  
Bearings—3.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.0015".

### CONNECTING RODS

End Clearance—.006"—.010".  
Dia. Clearance—.001".

### COOLING SYSTEM

Capacity—20 qts.  
Pump Drive—V-belt.  
Belt Size—42°V—44 $\frac{3}{8}$ "x.781".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—3.  
Material—Bronze back, babbitt lined.  
End Thrust Taken On—Center bearing.  
End Clearance—.006"—.012".  
Dia. Clearance—.001".

### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Dual down draft.  
Fuel Delivery—Camshaft pump.  
Adjustment—Idle only;  $\frac{1}{4}$ — $\frac{3}{4}$  turn open.

### LUBRICATION

Type—Splash.  
Pump Type—Oscillating plunger.  
Capacity—5 qts.  
Oil Pressure—Normal 3#.  
Adjustment—None.  
Oil—Above 50°F—S.A.E. #30; 10° to 80°F—S.A.E. 20W; -10° to +40°F—S.A.E. 10W; -30° to +20°F—S.A.E. 10W + 10% kerosene.

### PISTONS

Material—Lo-Ex alum. alloy cam ground.  
T-slot.  
Clearance—Top—.016".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.009"—.011".  
No. Comp. Rings—2.  
Width—.093".  
No. Oil Rings—2.  
Width—.187" above pin, .187" below pin.

### PISTON PINS

Type—Floating.  
Fit in Piston—.0003" at 200°F.  
Fit in Rod—.0003".

### VALVES AND TAPPETS

Dia. Exhaust—1.375".  
Dia. Intake—1.375".  
Stem Dia.—.375".  
Seat Angle—45°.  
Seat Width— $\frac{1}{8}$ ".  
Tappet Type—Roll cam design.  
Clearance—Hot; Intake—.008".  
Exhaust—.010".

Guides Removable—Yes.

Spring Pressure—44# @ 2"; 102# @ 1.656".

## CHASSIS

### FRONT AXLE

Caster—1°-2°.  
Camber—1°-1 $\frac{1}{2}$ °.  
Toe-in—0"— $\frac{1}{8}$ ".  
Kingpin Angle—7°.  
Tie Rod Adj.—

### REAR AXLE

Type—Own semi-floating, spiral bevel.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—.000"—.001".  
Lash—.0005"—.0035".  
Diff. Bearing Type—Bower.  
Adjustment—Screw.  
End Play—.009" tension.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own with electric hand.  
Main Shaft Bearing Type and No.—#205 Radial.  
Countershaft Bearing Type and No.—Steel backed babbit.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—22 $\frac{1}{8}$ "x1 $\frac{3}{4}$ "x.218".  
Adjustments—Eccentric for centralizing, adjusting screw for clearance, adjustable anchor.

Clearance—Top—.010".

Bottom—.010".

Brake Effort—50-50.

### CLUTCH

Type—Own single plate.  
Pilot Bearing Type and No.—#200 Radial.  
Facing Type—Cork.  
Throwout Bearing Type and No.—Special ball.

### SPRINGS

Type Front—Semi-elliptic with safety control arms.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded.

### STEERING GEAR

Type—Gemmer Worm and Roller.  
Adjustments—Column—shims. Cross shaft—set screw. Mesh—set screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite MAB 4075.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5.5 volts @ 2250 RPM.  
Lock Torque—22.5 ft. lbs., 780 amps., 4.0 volts.  
Brush Spring Tension—46 to 53 oz.

### GENERATOR

Make—Auto-Lite GC-J-4803-A.  
Drive—Fan Belt.  
Regulation—Voltage regulator.  
Thermostat—  
Output, cold—25 amps., 8 volts, 2500 RPM.  
Output, hot—21.7 amps., 8 volts, 2700 RPM, 29.5 MPH.  
Brush Spr. Tension—23 to 27 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to close—6.5 to 7.25 volts.  
Amps. Discharge to Open—0.5 to 2.5 at 6.5 volts.  
Field Fuse—None.

### IGNITION

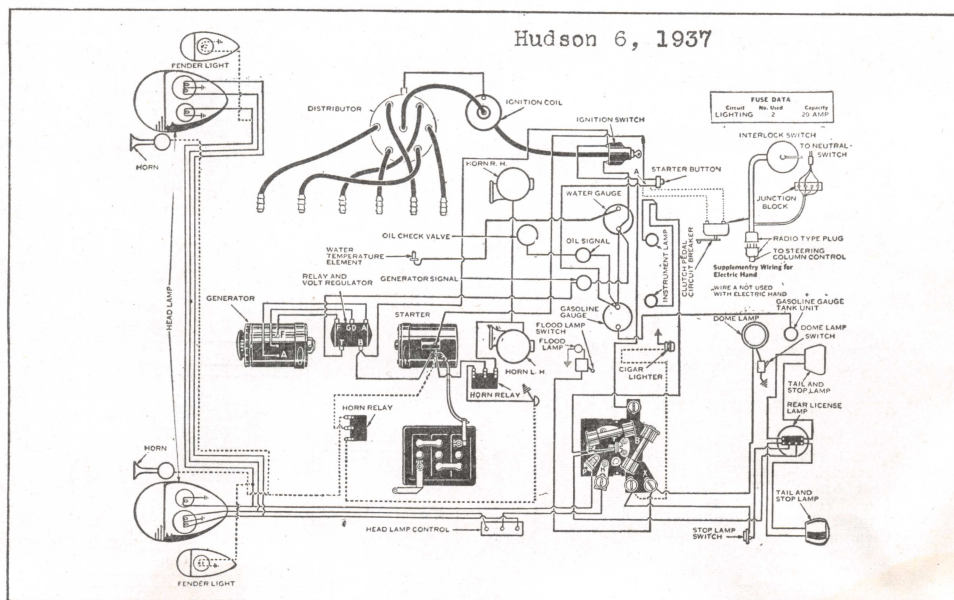
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spr. Tension—18-20 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—Champion "J-8" 14 m/m.  
Super power dome head "H-10".  
Manual Advance—None.  
Automatic Adv.—28° engine.  
Timing—Top dead center.  
Coil Amps., Engine Idling—2.5.  
Coil Amps., Engine Stopped—4.5.

### BATTERY

Amps.—105 amp. hr., located left side under hood.

### LAMPS

Head—#2331.  
Park—55.  
Instrument—55.  
Fuse—20 amps.  
Dome—87.  
Stop and Tail—1158.





MODELS 74, 75, 76 and 77

## ELECTRICAL DATA

### Wiring Diagram



# Hupmobile 6, 1938

SERIES E-622

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{2}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable H. P.—29.42.  
Displacement—245.3 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—101 at 3600 r.p.m.

### CAMSHAFT

Drive—Morse chain.  
Chain Data—51 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Marks on sprockets opposite each other on line through shaft centers.  
No slack in chain.  
Bearings—Not given.  
End Thrust Taken On—Thrust plunger, front end.  
Bearing Clearance—.002".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—18 qts.  
Pump Drive—Belt.  
Belt Size—42"V—42" x  $1\frac{1}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt, steel-backed.  
End Thrust Taken On—No. 2 bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter "W-I"—398S.  
Type—Single downdraft.  
Adjustment—Idle only,  $\frac{3}{4}$ - $1\frac{1}{4}$  turns open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity— $6\frac{1}{2}$  qts.  
Oil Pressure—30 lbs. at 30 m.p.h. (3 to 5 lbs. idling).  
Adjustment—Not given.  
Oil—  
Summer—  
High speed above 90° F.S.A.E. No. 40  
45°-90° F.S.A.E. No. 30  
Moderate Winter—  
0°-45° F.S.A.E. No. 20  
Extreme Winter—  
Below 0° F.S.A.E. No. 10W.

### PISTONS

Material—Bohn alum., Invar strut.  
Clearance—Top—.0205"-.026".  
Clearance—Bottom—.002"-.0025" with 8 lbs. pull on thickness gauge.

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0005".  
Fit in Rod—.0005".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—.341".  
Seat Angle—45°.  
Seat Width—Int.,  $\frac{1}{16}$ "- $\frac{5}{64}$ "; Ex.,  $\frac{3}{32}$ "- $\frac{7}{64}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.010".  
Exhaust—.013".  
Guides Removable—Not specified.  
Spring Pressure—40 lbs. at  $1\frac{1}{16}$ ".  
100 lbs. at  $1\frac{1}{32}$ ".  
 $\frac{2}{364}$ " free length.

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ ".  
Camber—1".  
Toe-in— $\frac{1}{16}$ "- $\frac{3}{16}$ ".  
Kingpin Angle— $7\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Spicer Model 42, semi-floating, spiral bevel.  
Pinion Bearing Type—Timken 02872-02820 and 31593 and 31520.  
Adjustment—Shims.  
End Play—Not specified.  
Lash—.004"-.007".  
Diff. Bearing Type—Timken No. 25577 and 25523.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing— $2\frac{3}{4}$  pts.

### TRANSMISSION

Make and Type—Three-speed, Warner gear, "T86".  
Main Shaft Bearing Type and No.—M.R.C. 207 SFG and 305 SFG.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Lockheed hydraulic, two-shoe.  
Lining Type—Moulded.  
Lining Size— $20\frac{3}{4}$ " x 2" x  $\frac{3}{16}$ ".  
Adjustments—Cam for clearance.  
Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.005".  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—B. & B., single plate.  
Facing Type—One moulded and one woven.  
Pilot Bearing Type and No.—Roller,  $\frac{5}{8}$ " I.D. x  $1\frac{1}{8}$ " O.D. x 1".  
Throwout Bearing Type and No.—Aetna Ball No. A899.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded "U."

### STEERING GEAR

Type—Gemmer worm and double roller.  
Adjustments—Column end play—shims.  
Cross-shaft end play—adjusting screw.  
Mesh—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAJ 4040.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—67 amps., 5.5 volts, 4100 r.p.m.  
Lock Torque—17 ft. lbs., 750 amps., 4.0 volts.  
Brush Spring Tension—42-53 oz., new brushes.

### GENERATOR

Make—Auto-Lite—GDF 4804A.  
Drive—Belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—30 amps., 8.0 volts, 3200 r.p.m.  
Output, hot—28 amps., 8.0 volts, 3200 r.p.m., 34 m.p.h.  
Brush Spring Tension—Max., 53 oz., new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts at  $9\frac{1}{2}$  m.p.h.  
Amps. Discharge to Open—0-2.0 amps.  
Field Fuse—None.

### IGNITION

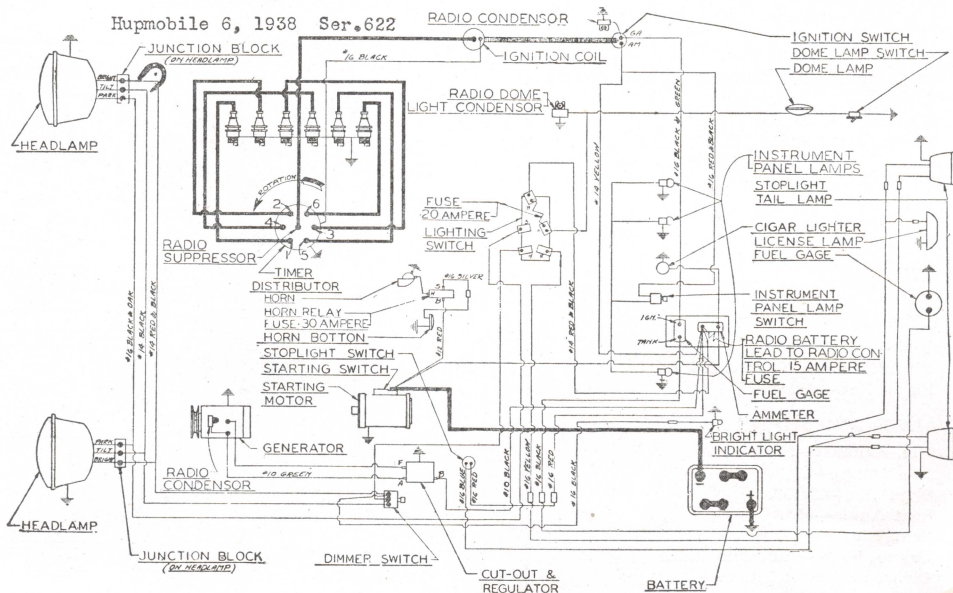
Distributor—Auto-Lite—IGC 4277.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.022".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.026"-.030".  
Spark Plug Size—18 m/m, Champion No. 7.  
Manual Advance—None.  
Automatic Advance—14° engine; full advance or .022" piston travel before top dead center.  
Timing—7° before top dead center.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—105 amp. hr.

### LAMPS

Head—No. 2320.  
Park—No. 63.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 81.  
Stop and Tail—No. 1158.





# Hupmobile 8, 1938

SERIES H

## ENGINE

## CHASSIS

## ELECTRICAL DATA

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{3}{4}$ "  
Taxable H. P.—32.51.  
Displacement—303.2 cu. in.  
Firing Order—1-4-7-3-8-5-2-6.  
Max. H. P.—120 at 3600 r.p.m.

### CAMSHAFT

Drive—Morse chain.  
Chain Data—66 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—15 links between sprocket marks, No. 1 on top dead center.  
Bearings—6.  
End Thrust Taken On—Plunger front end.  
Bearing Clearance—.002".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0015"-.0025".

### COOLING SYSTEM

Capacity— $21\frac{1}{2}$  qts.  
Pump Drive—Not given.  
Belt Size—V— $46\frac{3}{32}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Not given.

### CRANKSHAFT

No. Bearings—5.  
Material—Babbitt, steel back.  
End Thrust Taken On—Rear intermediate bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter "W.D.O."  
Type—Dual downdraft.  
Adjustment—Idle adjustment only,  $\frac{1}{4}$ -1 turn open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—8 qts.  
Oil Pressure—30 lbs. at 30 m.p.h.  
Adjustment—Thread.  
Winter Oil—S.A.E. No. 20.  
Summer Oil—S.A.E. No. 30.

### PISTONS

Material—Bohn alum., steel strut.  
Clearance—Top—Not given.  
Clearance—Bottom—.002" with 6 to 8 lbs. pull on thickness gauge.

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0005".  
Fit in Rod—.0005".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{7}{32}$ ".  
Stem Dia.—.341".  
Seat Angle—45".  
Seat Width—Int.,  $\frac{1}{16}$ "- $\frac{5}{64}$ "; Ex.,  $\frac{3}{32}$ "- $\frac{7}{64}$ ".  
Tappet Type—Lever and roller.  
Clearance—Hot: Intake—.008".  
Exhaust—.013".  
Guides Removable—Yes.  
Spring Pressure—40 lbs. at  $1\frac{1}{16}$ ".  
100 lbs. at  $1\frac{1}{32}$ ".

### FRONT AXLE

Caster— $1\frac{1}{2}$ ".  
Camber— $1\frac{1}{4}$ ".  
Toe-in— $\frac{1}{16}$ ".  
Kingpin Angle— $8\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.003"-.008".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{1}{2}$  pts.

### TRANSMISSION

Make and Type—Warner gear.  
Main Shaft Bearing Type and No.—MRC 208MFG and 209S.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size— $25\frac{1}{8}$ " x 2" x  $\frac{3}{16}$ ".  
Adjustments—Eccentric or cam for clearance.  
Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.005".  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Not given.  
Throwout Bearing Type and No.—Not given.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded "U."

### STEERING GEAR

Type—Gemmer worm and roller.  
Adjustments—Column end play—shims.  
Cross-shaft end play—adjusting screw.  
Mesh—adjusting screw.  
Lubricant—Steering gear lubricant.

### STARTING MOTOR

Make—Auto-Lite—MAB 4095.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque— $21\frac{1}{2}$  ft. lbs., 4.0 volts, 750 amps.  
Brush Spring Tension—42-53 oz., with new brushes.

### GENERATOR

Make—Auto-Lite—GDF 4804A.  
Drive—Belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—32 amps., 8.0 volts, 3200 r.p.m.  
Output, hot—28 amps., 8.0 volts, 3200 r.p.m. or 33.9 m.p.m.  
Brush Spring Tension—Max., 53 oz. with new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts at 9.2 m.p.h.  
Amps. Discharge to Open—0-2.0 amps.  
Field Fuse—None.

### IGNITION

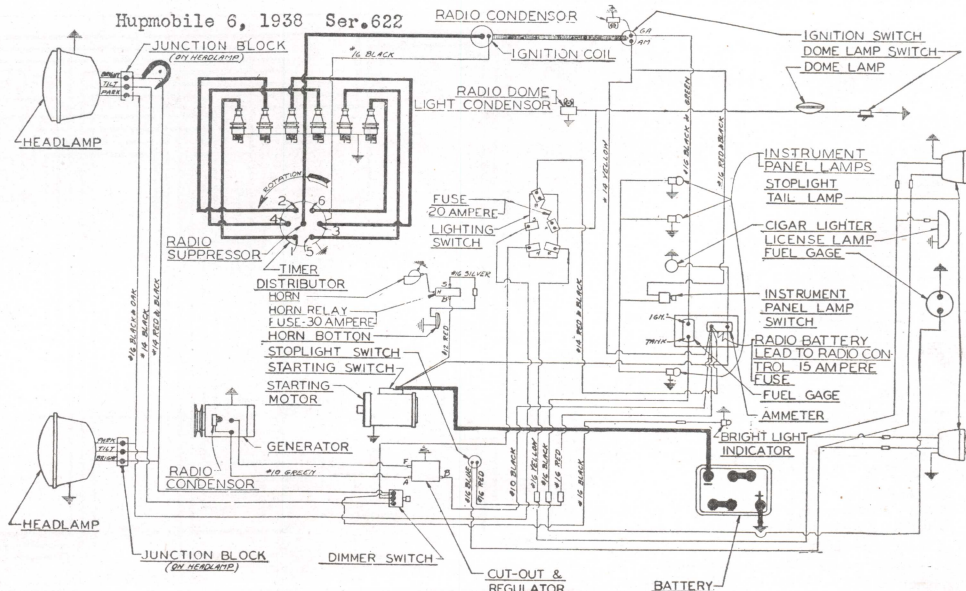
Distributor—Auto-Lite—IGT-4008.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.016".  
Brush Spring Tension—18-23 oz.  
Spark Plug Gap—.028".  
Spark Plug Size—18 m/m Champion No. 7.  
Manual Advance—None.  
Automatic Advance—13".  
Vacuum Advance—16".  
Timing—7 degs. before top dead center.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—120 amp. hr.

### LAMPS

Head—No. 2320.  
Park—No. 63.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 81.  
Stop and Tail—No. 1158.





SERIES 38-50

### ELECTRICAL DATA

## STARTING MOTOR

Make—Delco-Remy 727V.  
Drive—Solenoid shifted gear.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts at 5500 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3.0  
volts.  
Brush Spring Tension—24-28 oz.

## GENERATOR

Make—Delco-Remy No. 1101051.  
Drive—Belt V-type,  $\frac{34}{8}$ " wide x  $47\frac{3}{16}$ ".  
Regulation—Voltage regulator.  
Thermostat—None.  
Output—28-30 amps. cold. Due to voltage regulation actual charging rate is controlled by state of battery charge.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7.0 volts.  
Amps. Discharge to Open—0.3.  
Field Fuse—None.

## IGNITION

Distributor—Delco-Remy No. 665-G.  
Coil—Delco-Remy No. 539-C.  
Distr. Rotation—Clockwise.  
Breaker Gap—.0125".-0.0175".  
Brush Spring Tension—Not given.  
Spark Plug Gap—.025".-0.030".  
Spark Plug Size—14 mm, A. C. No. 45.  
Manual Advance—20°.  
Automatic Advance—22°.  
Vacuum Advance—None.  
Timing—5 degs. before top dead center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

## BATTERY

Amps.—Delco—110 amp. hour.

## LAMPS

Head—No. 2330L.  
Park—No. 55 in headlamps.  
Instrument and Indicators—No. 51.  
Fuse—Not given.  
Dome—No. 81.  
Stop and Tail—No. 1154 and No. 63.

IGNITION COIL

DISTRIBUTOR  
BREAKER MECHANISM  
AND CONDENSER

7MM SPARK PLUG WIRE

HEAD LAMP AND PARKING LAMP  
30-32 C P NO. 2330-L  
13-C P NO. 55 BULBS

STEERING COIL COIL

ELECT. CHOK

HORN RELAY

LOW NOTE

HIGHS

HEAD LAMP AND PARKING LAMP  
30-32 C P NO. 2330-L  
13-C P NO. 55 BULBS

GENERATOR

VOLTAGE REGULATOR

STARTER SOLENOID AND RELAY

STARTING MOTOR

BATTERY

GROUND ON FRAME

LOW NOTE

HIGHS

HEAD LAMP AND PARKING LAMP  
30-32 C P NO. 2330-L  
13-C P NO. 55 BULBS

65 LaSALLE, 1936 38-50

Wiring diagram for the 1966 Ford Mustang 2-door hardtop. The diagram shows the electrical system including the battery, alternator, steering coil condenser, horn relay, and head lamp/parking lamp assembly. It includes a fuse block with a 15A fuse for the head lamp and parking lamp, and a 30A fuse for the horn relay. The diagram also shows the connection to the 1966 Ford Mustang 2-door hardtop.

15

## PISTONS

**REAR LAMP**  
3 C.P. S.C. NO 63  
20 C.P. S.C. NO 10-14  
BULBS

**STOP SWITCH**

**LIGHT SWITCH & THERMOSTAT RELAY**

**STARTER PUSH-BUTTON**

**HEATER SWITCH**

**GAS GAUGE**

**HEAD LAMP INDICATORS & BROWSTAMP LIGHTS**  
1 C.P. S.C. NO 58-BULBS

**AMMETER**

**IGNITION SWITCH**

**IGNITION SWITCH LIGHT**  
1 C.P. S.C. NO 58-BULB

**CLOCK**  
1 C.P. S.C. NO 58-BULB

**INSTRUMENT LIGHTS SWITCH**

**CIGAR LIGHTER**

**KEY TO WIRE COLORS**

B BLACK  
G GREEN  
RED RED  
T BLACK TRACER  
H RED TRACER  
O GREEN TRACER  
B1 BLACK CROSS TRACER  
B2 RED CROSS TRACER  
G4 GREEN CROSS TRACER  
B3 BLACK & RED CROSS TRACER  
H1 RED & GREEN CROSS TRACER  
ALL TRACER/SECTION NATURAL WIRES

**REAR LAMP**  
20 C.P. S.C. NO 10-14 BULB

**HEAD LAMP AND PARKING LAMP**  
30-32 C.P. NO 2330-L  
15 C.P. NO 55-BULBS

**LOW NOTE**

**HORN**

**HIGH NOTE**

**HEAD LAMP AND PARKING LAMP**  
30-32 C.P. NO 2330-L  
15 C.P. NO 55-BULBS

**CADILLAC, 1938 60 & 65**

**LaSALLE, 1938 38-50**

## PISTON RINGS

Gap—Comp., .007"-.012"; oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

## PISTON PINS

Type—Floating.  
Fit in Piston—.0004" press at one  
end;.0000" clearance other end.  
Fit in Rod—.0002"-.0008".

## VALVES AND TAPPETS

Dia. Exhaust—Not given.  
Dia. Intake—1.876"—1.886".  
Stem Dia.—Int., .3415"—.3425"; Exh.,  
.3405"—.3415".  
Seat Angle—45°.  
Seat Width— $\frac{5}{64}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—Automatic adjustment.  
Exhaust—Automatic adjustment.  
Guides Removable—Yes.  
Spring Pressure—66 lbs. at 1.926".  
145 lbs. at 1.581".







# La Salle Model 36-50 1936

## ENGINE

### DATA

No. of Cylinders—8.  
Bore—3".  
Stroke—4 $\frac{3}{8}$ ".  
Taxable H. P.—28.8.  
Displacement—248 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—105 @ 3600 r.p.m.

### CAMSHAFT

Drive—Whitney No. C L-205 chain.  
Chain Data—46 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6.  
End Thrust Taken On—Front Bearing.  
Bearing Clearance—.002"-.004".

### CONNECTING RODS

End Clearance—.005".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity—4 $\frac{1}{2}$  gals.  
Pump Drive—Fan belt.  
Belt Size—49 $\frac{3}{4}$ " x  $5\frac{1}{4}$ ", V-type.  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—5.  
Material—Bronze-backed babbitt.  
End Thrust Taken On—No. 1 bearing, upper half.  
End Clearance—.004".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-15".  
Type—Downdraft.  
Adjustment—Turn in for lean, out for rich mixture, for idling adjustment.  
High speed non-adjustable.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—25 lbs. at 60 m.p.h.  
Adjustment—None.  
Winter Oil—S. A. E. No. 20.  
Summer Oil—S. A. E. No. 40.

### PISTONS

Material—Lynite Lo-Ex. alum. alloy.  
T-slot anodized.  
Clearance—Top—.015".  
Clearance—Bottom—.0016-.002" top of skirt.  
.0011"-.0015" bottom of skirt.

### PISTON RINGS

Gap—Comp., .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width—.1235"-.1240".  
No. Oil Rings—2.  
Width—1—.1545"-.1550"; 1—.1235"-.1240".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—Free end .001" clearance; locked end .0003" press fit.  
Fit in Rod—Push fit.

### VALVES AND TAPPETS

Dia. Exhaust—1.421".  
Dia. Intake—1.562".  
Stem Dia.—Intake .342"—Exh., .341".  
Seat Angle—Intake 30°—Exh., 45°.  
Seat Width—.042"-.052".  
Clearance—Hot—Intake—.006".  
Exhaust—.009".  
Guides Removable—Yes.  
Spring Pressure—43 lbs. at 2.250", valve closed.  
96 lbs. at 1.906" valve open.

## CHASSIS

### FRONT AXLE

Caster—2°.  
Camber—1°.  
Toe-in— $\frac{1}{8}$ ".  
Kingpin Angle—4°—51'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bawl.  
Pinion Bearing Type—N. D. No. 5307 S. C. and Hyatt No. 1287465.  
Adjustment—Pinion adjustment, shims, bearings—no adjustment.  
End Play—None.  
Lash—.004"-.008".  
Diff. Bearing Type—Timken roller No. 372A.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—5 pts.

### TRANSMISSION

Make and Type—Own—Synchro-mesh, helical gears.  
Main Shaft Bearing Type and No.—N. D. Ball No. 47507.  
Countershaft Bearing Type and No.—Hyatt No. 92424.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Primary—moulded, secondary—woven.  
Lining Size—25 $\frac{7}{8}$ " x 2" x  $\frac{3}{16}$ ".  
Adjustments  
Eccentric and adjusting wheel for clearance.  
Anchor adjustment sliding type.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—Front 55%; rear 45%.

### CLUTCH

Type—Dry plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No. 7502.  
Throwout Bearing Type and No.—Graphite,  $1\frac{1}{2}$ " x 2 $\frac{3}{8}$ " x  $\frac{5}{8}$ ".

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Not given.

### STEERING GEAR

Type—Worm and roller, "Saginaw."  
Adjustments—Column end play adjusting nut. Cross shaft end play—adjusting screw.  
Eccentric for worm and roller mesh.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 727 N.  
Drive—Solenoid shifted gear.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts at 5500 r.p.m.  
Lock Torque—15 ft. lbs. at 600 amps., 30 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy No. 961 D.  
Drive—Belt.  
Regulation—Voltage and current regulation.  
Thermostat—None.  
Output, cold—22 amps.—8.1-8.3 volts—1900 r.p.m.  
Output, hot—Due to voltage regulation, actual charging rate is controlled by state of charge of battery—constant above 1700 r.p.m.—20 m.p.h.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.8-7.3 volts—12 m.p.h.  
Amps. Discharge to Open—0.2.  
Field Fuse—None.

### IGNITION

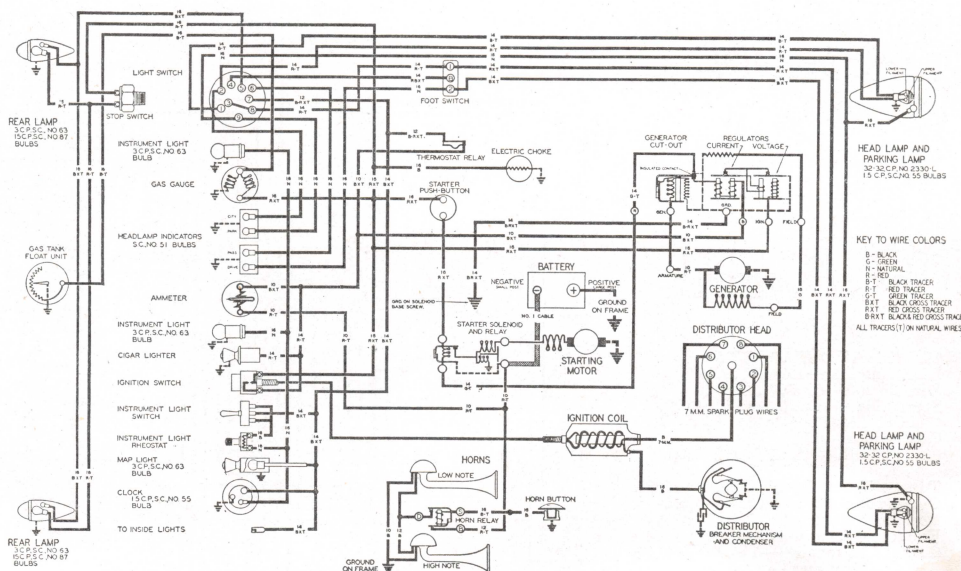
Distributor—Delco-Remy.  
Coil—Delco-Remy 539 C.  
Distr. Rotation—Counter-clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.025"-.027".  
Spark Plug Size—A. C. "K-9" 14 m/m.  
Manual Advance—20°.  
Automatic Advance—28°.  
Vacuum Advance—18°.  
Timing—8° before top center.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—Delco, 110 amps hr., No. 17 K. W.

### LAMPS

Head—32-32—C. P. No. 2330-L.  
Park—1.5 C. P. No. 55. Map light No. 63.  
Headlamp indicators No. 51.  
Instrument—3 C. P. No. 63.  
Fuse—None (Thermostat relay).  
Dome—No. 87.  
Stop and Tail—No. 63 and No. 87.



Wiring Diagram applying to both Series 35-50, 1935, and Series 36-50, 1936, LaSalle cars.



# Lincoln V-12, 1938

## ENGINE

### DATA

No. of Cylinders—12.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—46.8.  
Displacement—414.0 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—150 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain, with automatic adjustment.  
Chain Data—104 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to timing marks on flywheel.  
Bearings—5, babbitt-lined, steel bushings.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0005"-.002".

### CONNECTING RODS

End Clearance—Total .006"-.015".  
Dia. Clearance—.0015"-.003".

### COOLING SYSTEM

Capacity—32 qts.  
Pump Drive—Coupling off generator.  
Belt Size—45° V,  $40\frac{3}{4}$ " x 1".  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Copper-lead, steel back.  
End Thrust Taken On—Rear bearing.  
End Clearance—.004"-.007".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual downdraft.  
Adjustment—Idle—turn in to lean, out to enrich.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—12 qts.  
Oil Pressure—40 lbs. at 50 m.p.h.  
Adjustment—Non-adjustable.  
Oil { Above 90° F...S.A.E. No. 40  
      Above 32° F...S.A.E. No. 30  
      Above 10° F...S.A.E. No. 20 or 20W.  
      Below -10° F...S.A.E. No. 10W.  
      Below -10° F...S.A.E. No. 10W.  
      plus 10% kerosene.

### PISTONS

Material—Alum. alloy.  
Clearance—Top—Not given.  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—Comp., .008"-.015"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width—1.235"-.1240".  
No. Oil Rings—2.  
Width—.1545"-.1550".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—Not given.  
Fit in Rod—.0005".

### VALVES AND TAPPETS

Dia. Exhaust—1.687".  
Dia. Intake—1.687".  
Stem Dia.—.3125".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ " max.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—55-60 lbs. at 2.687".  
130-140 lbs. at 2.343".

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ ° loaded.  
Camber—1°.  
Toe-in— $\frac{1}{16}$ "-. $\frac{1}{8}$ ".  
Kingpin Angle— $7\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Full floating, spiral bevel.  
Pinion Bearing Type—Roller bearing.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.010".  
Diff. Bearing Type—Roller bearing.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Synchro-mesh, helical gears.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Bendix mechanical.  
Lining Type—Primary, moulded; secondary, woven.  
Lining Size— $33\frac{1}{2}$ " x  $2\frac{1}{2}$ " x  $\frac{1}{4}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate, semi-centrifugal.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Ball.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft—adjusting screw.  
Mesh—eccentric.  
Lubricant—Above freezing, S.A.E. 160.  
Below freezing, S.A.E. 90.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Counter-clockwise.  
No Load—44 amps., 5.5 volts, 2700 r.p.m.  
Lock Torque—14 ft. lbs., 715 amps., 3.0 volts (max. torque 33 ft. lbs.).  
Brush Spring Tension—24-32 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Chain.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—22 amps., 8.0 volts, 1300 r.p.m.  
Output, hot—16 amps., 8.0 volts, 1300 r.p.m.  
Brush Spring Tension—22-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.75-7.5 volts at 10 m.p.h.  
Amps. Discharge to Open—3.0 amps.  
Field Fuse—Not specified.

### IGNITION

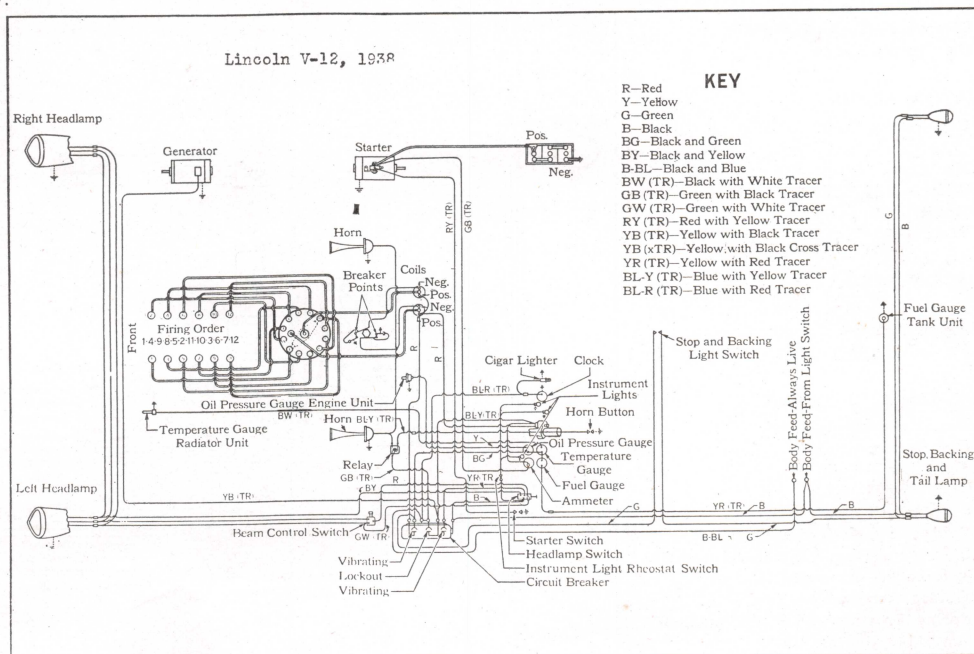
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise, viewed from top.  
Breaker Gap—.020".  
Brush Spring Tension—14-16 oz.  
Spark Plug Gap—.028"-.030".  
Spark Plug Size—18 m Champion No. 7.  
Manual Advance—None.  
Automatic Advance—17° max. crankshaft.  
Timing—Top dead center.  
Coil Amps., Engine Idling—1.5 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—147 amp. hour.

### LAMPS

Head—32-32 c. p.  
Park— $1\frac{1}{2}$  c. p.  
Instrument—6 c. p.  
Fuse—Not given.  
Dome—6 c. p.  
Stop and Tail—21 and 3 c. p.





# Lincoln 12, 1937

## ENGINE

### DATA

No. of Cylinders—12 (67° included angle).  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{1}{2}$ "  
Taxable H. P.—46.8.  
Displacement—414.0 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—150 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain (Automatic Adjustment).  
Chain Data—104 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Check to timing marks on flywheel.  
Bearings—5-Babbitt lined bronze bushings.  
End Thrust Taken On—Front bearing.  
Bearing Clearance—.0005"-.002".

### CONNECTING RODS

End Clearance—.006"-.015".  
Dia. Clearance—.0015" to .003".

### COOLING SYSTEM

Capacity—32 qts.  
Pump Drive—Off Generator.  
Belt Size—45° V-40 $\frac{3}{4}$ " outside x 1".  
Belt Adjustment—Fan mounting.  
Pump Pack, Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Copper-lead, steel backed.  
End Thrust Taken On—Rear bearing.  
End Clearance—.004"-.007".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE."  
Type—Dual downdraft.  
Adjustment—Turning idle adjustment out gives richer mixture; in gives a leaner mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—12.  
Oil Pressure—40 lbs. at 50 m.p.h.  
Adjustment—Non-adjustable.

### Oil

Summer S. A. E. No. 40.  
Winter S. A. E. 20-W.  
S. A. E. No. 20 may be used when winter temperature is above freezing.

### PISTONS

Material—Alum. Alloy.  
Clearance—Top—Not given.  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—Comp. .008"-.015"; oil .007"-.015".  
No. Comp. Rings—2.  
Width—.1235"-.1240".  
No. Oil Rings—2.  
Width—.1545"-.1550".

### PISTON PINS

Type—Locked in Piston.  
Fit in Piston—Not given.  
Fit in Rod—.0005".

### VALVES AND TAPPETS

Dia. Exhaust—1.687".  
Dia. Intake—1.687".  
Stem Dia.— $\frac{5}{16}$ ".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ " max.  
Tappet Type—Hydraulic.  
Clearance—Hot: Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—55-60 lbs. at 2.687".  
130-140 lbs. at 2.343"

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ " loaded.  
Camber—1".  
Toe-in— $\frac{1}{16}$ "- $\frac{1}{8}$ ".  
Kingspin Angle— $7\frac{1}{2}$ ".  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type—Spiral bevel—Full floating type.  
Pinion Bearing Type—Roller bearing.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.010".  
Diff. Bearing Type—Roller bearing.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—6 pints.

### TRANSMISSION

Make and Type—Own, helical gear type.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Mechanical.  
Lining Type—Moulded.  
Lining Size— $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " x  $\frac{1}{4}$ ".  
Adjustments—Eccentric for Centralizing;  
Adjusting screw for clearance; Adjustable anchor.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Ball.  
Throwout Bearing Type and No.—Gur. 211 CTQ.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle adjustment—Metal-Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover. Cross-shaft—adjusting screw.  
Mesh—eccentric.  
Lubricant—Above freezing, S.A.E. 160 E.P. below freezing, S.A.E. 90 or 110 E.P.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
\*Rotation—Counter-clockwise.  
No Load—44 amps., 5.5 volts, 2700 r.p.m.  
Lock Torque—14 ft. lbs., 715 amps., 3 volts.  
Brush Spring Tension—24-32 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Chain.  
Regulation—Third brush and voltage control.  
Output, cold—22 amps., 8.0 volts, 1300 rpm  
Output, hot—16 amps., 8.0 volts, 1300 rpm  
Brush Spr. Tension—22-27 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to close—6.75-7.5 volts at 10 m.p.h.  
Amps. Discharge to Open—2.0-3.0.

### IGNITION

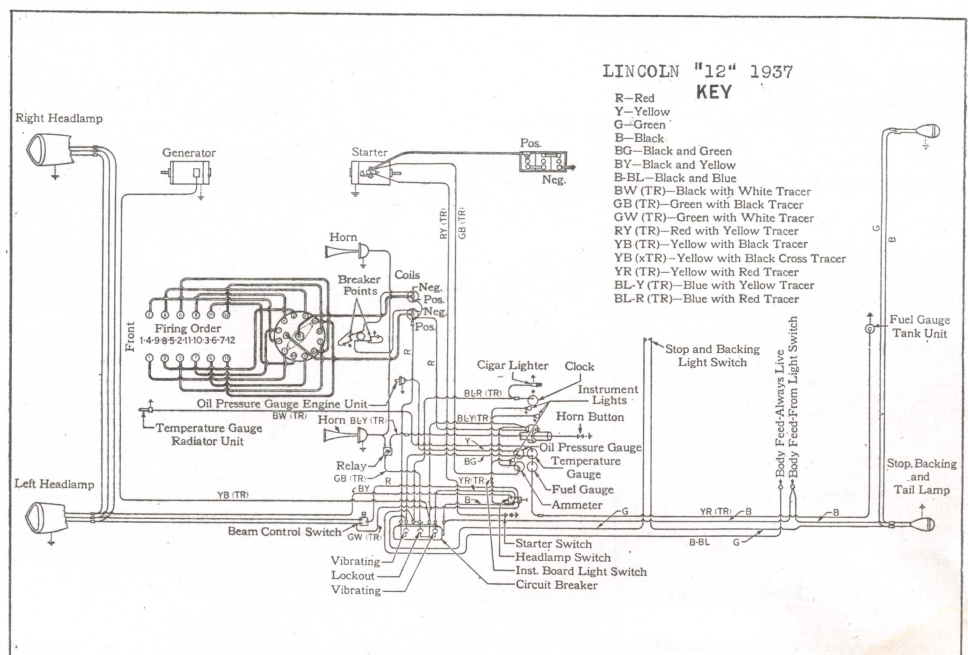
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise viewed from top.  
Breaker Gap—.020".  
Brush Spr. Tension—14-16 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—Champion No. 7, 18 m/m.  
Manual Advance—None.  
Automatic Adv.—17° crankshaft.  
Timing—Top dead center.  
Coil Amps., Engine Idling—1.5.  
Coil Amps., Engine Stopped—5.

### BATTERY

Amps—147 amp hours.

### LAMPS

Head—32-32 C. P.  
Park— $1\frac{1}{2}$  C. P.  
Instrument—6 C. P.  
Dome—6 C. P.  
Stop and Tail—21-3 C. P.





# Lincoln-Zephyr, 1938

## ENGINE

### DATA

No. of Cylinders—12 (Model 86H.)  
Bore— $2\frac{3}{4}$ "  
Stroke— $3\frac{3}{4}$ "  
Taxable H. P.—36.30.  
Displacement—267.28 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—110 at 3900 r.p.m.

### CAMSHAFT

Drive—Gears.  
Chain Data—Not given.  
Valve Timing—Gear marks in alignment.  
Bearings—4, babbitt-lined, steel-backed.  
End Thrust Taken On—Thrust plate, front end.  
Bearing Clearance—.0015"-.003".

### CONNECTING RODS

End Clearance—.006"-.015" total.  
Dia. Clearance—.0015"-.003".

### COOLING SYSTEM

Capacity—30 qts.  
Pump Drive—Belt.  
Belt Size—28"V, 54.4" x .63".  
Belt adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Copper-lead, steel back.  
End Thrust Taken On—Rear bearing.  
End Clearance—.002"-.006".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual downdraft.  
Adjustment—Idle—turn in to lean; out to enrich.  
Fuel Delivery—Mechanical diaphragm pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil { 30 lbs. at 50 m.p.h. (oil at 200°F.)  
Pressure { 34 lbs. at 70 m.p.h. (oil at 225°F.)  
Adjustment—Non-adjustable.

Winter Oil { Above 90°F. S.A.E. No. 40.  
Summer Oil { Above 32°F. S.A.E. No. 30.  
                  Above 10°F. S.A.E. No. 20  
                  or 20W.  
                  Above 10°F. S.A.E. No. 10W.  
                  Below 10°F. S.A.E. No. 10W.  
                  plus 10% kerosene.

### PISTONS

Material—Heat-treated steel alloy.  
Clearance—Top—Not given.  
Bottom—.002" (5 lbs. pull on  $\frac{1}{2}$ " feeler).

### PISTON RINGS

Gap—All rings .008"-.013".  
No. Comp Rings—2.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Floating  
Fit in Piston +.0001" or —.0001" slip.  
Fit in Rod—.0002"-.0009".

### VALVES AND TAPPETS

Dia. Exhaust—1.537".  
Dia. Intake—1.537".  
Stem Dia.—.3105"-.3115".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ " max.  
Tappet Type—Cylindrical, 1" diameter.  
Clearance—Hot:  
Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—  
51-57 lbs. valve closed.  
111-121 lbs. valve open.  
Free length 2.42".

## CHASSIS

### FRONT AXLE

Caster—4°.  
Camber— $\frac{3}{4}$ ".  
Toe-in— $\frac{3}{16}$ ".  
Kingpin Angle—4°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type— $\frac{3}{4}$  floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Correct adjustment 20 to 22-inch lbs.  
Lash—.005"-.007".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—4 pts

### TRANSMISSION

Make and Type—Synchro-mesh, helical gears.  
Main Shaft Bearing Type and No.—Federal 1208 CGT and 1306 CG.  
Countershaft Bearing Type and No.—Hyatt No. 99026.

### BRAKES

Type—Bendix mechanical.  
Lining Type—Primary moulded; secondary woven.  
Lining Size—23.9" x  $1\frac{1}{4}$ " x .210".  
Adjustments—Eccentric for centralizing.  
Adjusting wheel for clearance.  
Anchor—sliding type.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single disc, semi-centrifugal.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Federal 1203FO.  
Throwout Bearing Type and No.—Nice 5015-1.

### SPRINGS

Type Front—Transverse semi-elliptic.  
Type Rear—Transverse semi-elliptic.  
Shackle Adjustment—Oil-less type.

### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims at lower cover.  
Cross-shaft end play—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Above freezing S.A.E. No. 160.  
Below freezing S.A.E. No. 90.

## ELECTRICAL DATA

### STEERING MOTOR

Make—Own.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end  
No Load—Not given.  
Lock Torque—14 ft. lbs, 225 amps., 4.75 volts.  
Brush Spring Tension—32 oz.

### GENERATOR

Make—Own.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—28 amps., 1800 r.p.m., 30 m.p.h.  
Output, hot—26 amps., 7 volts, 1800 r.p.m., 30 m.p.h.  
Brush Spring Tension—20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—7.0 volts at 10 m.p.h.  
Amps. Discharge to Open—3.0 amps.  
Field Fuse—None.

### IGNITION

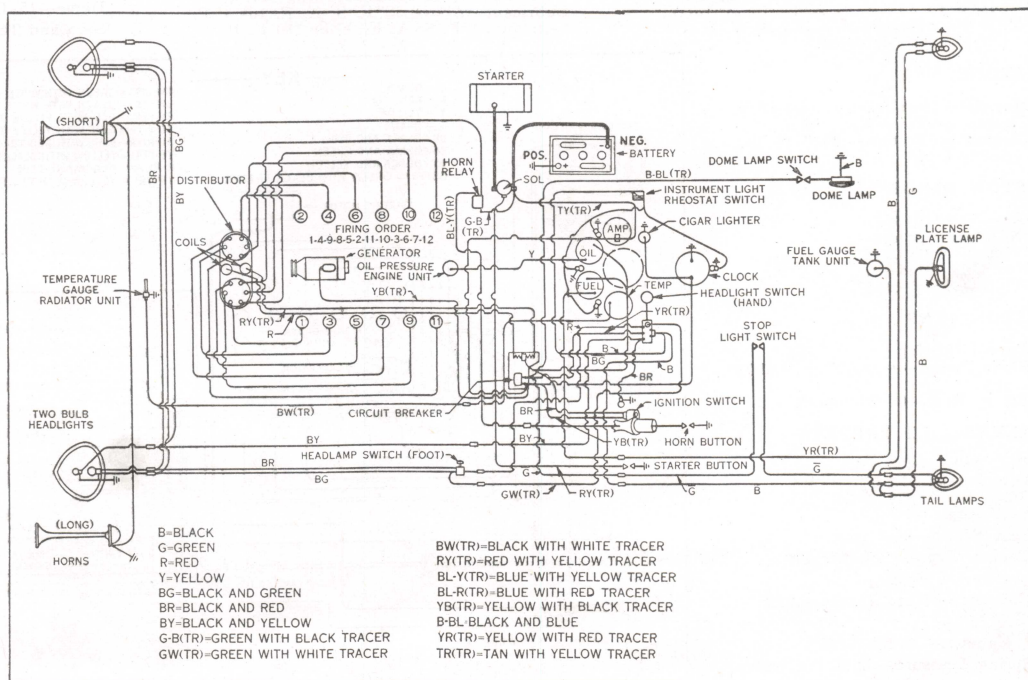
Distributor—Own.  
Coil—Own (2).  
Distr. Rotation—Counter-clockwise viewed from front.  
Breaker Gap—.014"-.016".  
Brush Spring Tension—20-24 oz.  
Spark Plug Gap—.028"-.030".  
Spark Plug Size—14 m/m Champion "H-10."  
Manual Advance—None.  
Automatic Advance—20° max. crankshaft.  
Timing—4° before top center.  
Coil Amps., Engine Idling—3.2 amps.  
Coil Amps., Engine Stopped—4.2 amps.

### BATTERY

Amps.—100 amp. hr.

### LAMPS

Head—32-32 c. p.  
Park— $1\frac{1}{2}$  c. p.  
Instrument—(5),  $1\frac{1}{2}$  c. p.  
Fuse—Not specified.  
Dome—6 c. p.  
Stop and Tail—21 and 3 c. p.





# Lincoln-Zephyr, 1937

## ENGINE

### DATA

No. of Cylinders—12 (75° V-L head) m/h.  
Bore—2 $\frac{3}{4}$ "  
Stroke—3 $\frac{3}{4}$ "  
Taxable HP.—36.3.  
Displacement—267.28 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. HP.—110 at 3900 r.p.m.

### CAMSHAFT

Drive—Gears.  
Valve Timing—Punch marks on gear in alignment.  
Bearings—4 babbit steel backed.  
End Thrust Taken On—Front end.  
Bearing Clearance—.0015"-.003".  
Copper-Lead bearings.

### CONNECTING RODS

Dia. Clearance—.0015"-.003".

### COOLING SYSTEM—Two Pumps

Capacity—27 qts.  
Pump Drive—V-Belt.  
Belt Size—28" V-54.4"x.63".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Copper-lead, steel back.  
End Thrust Taken On—Rear bearing.  
End Clearance—.002"-.006".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Dual down draft, 1" dia.  
Adjustment—Turning idle adjustment out gives richer mixture; in a leaner mixture.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6.  
Oil Pressure—30 lbs. at 55 m.p.h.  
Adjustment—Non-adjustable.  
Oil { Above 90°F, S. A. E. 50.  
30°F to 100°F, S. A. E. 40.  
20°F to 65°F, S. A. E. 30.  
0°F to 50°F, S. A. E. 20 or 20-W.  
15°F to 30°F, S. A. E. 10 or 10-W.  
10°F or lower, S. A. E. 10-W.  
+ 10% Kerosene.

### PISTONS

Material—Heat treated steel alloy.  
Clearance—Top—Not given.  
Clearance—Bottom—.002" (5 lbs. pull on  $\frac{1}{2}$ " feeler).

### PISTON RINGS

Gap—.008"-.013".  
No. Comp. Rings—2.  
Width—.093"-.0935".  
No. Oil Rings—1.  
Width—.1545"-.155".

### PISTON PINS

Type—Floating.  
Fit in Piston+.0001" or —.0001" slip  
Fit in Rod—.0002"-.0009".

### VALVES AND TAPPETS

Dia. Exhaust—1.537".  
Dia. Intake—1.537".  
Stem Dia.—.311".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ " max.  
Tappet Type—Cylindrical (Special Ford).  
Clearance—Hot: Intake—.0125"-.0135".  
Exhaust—.0125"-.0135".  
Spring Pressure—32-36 lbs., valve closed. 62-66 lbs., valve open.

## CHASSIS

### FRONT AXLE

Caster—4° loaded.  
Camber— $\frac{3}{4}$ "  
Toe-in— $\frac{3}{16}$ "  
Kingpin Angle—4°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type— $\frac{3}{4}$ " floating-straddle pinion mounting. (spiral bevel).  
Pinion Bearing Type—Taper and straight roller.  
Adjustment—Thread.  
End Play—12 to 17 inch lbs. on adjustment.  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  to 3 pts.

### TRANSMISSION

Make and Type—3 speed synchronized helical gears.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Mechanical.  
Lining Type—Moulded.  
Lining Size—23.9"x1.75"x.21"  
Adjustments—Single internal adjustment at each wheel, eccentric for centralizing; adjusting screw for clearance.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—10" single plate, semi-centrifugal.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Ball ND-7503.  
Throwout Bearing Type and No.—Ball Nice 5015-1.

### SPRINGS

Type Front—Transverse leaf.  
Type Rear—Transverse leaf.  
Shackle Adjustment—Oilless Type.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims at bottom; Cross shaft adjusting screw.  
Lubricant—Above 32°F, S. A. E. 16 E.P.  
Below 32°F, S. A. E. 90 or 110 E. P.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Own.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—Not given.  
Lock Torque—14 ft. lbs., 225 amps., 4.75 volts.  
Brush Spring Tension—32 oz.

### GENERATOR

Make—Own.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—18 amps.  
Output, hot—15 amps at 30 m.p.h.  
Brush Spr. Tension—20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to close—7 volts at 10 m.p.h.  
Amps. Discharge to Open—3.  
Field Fuse—Not given.

### IGNITION

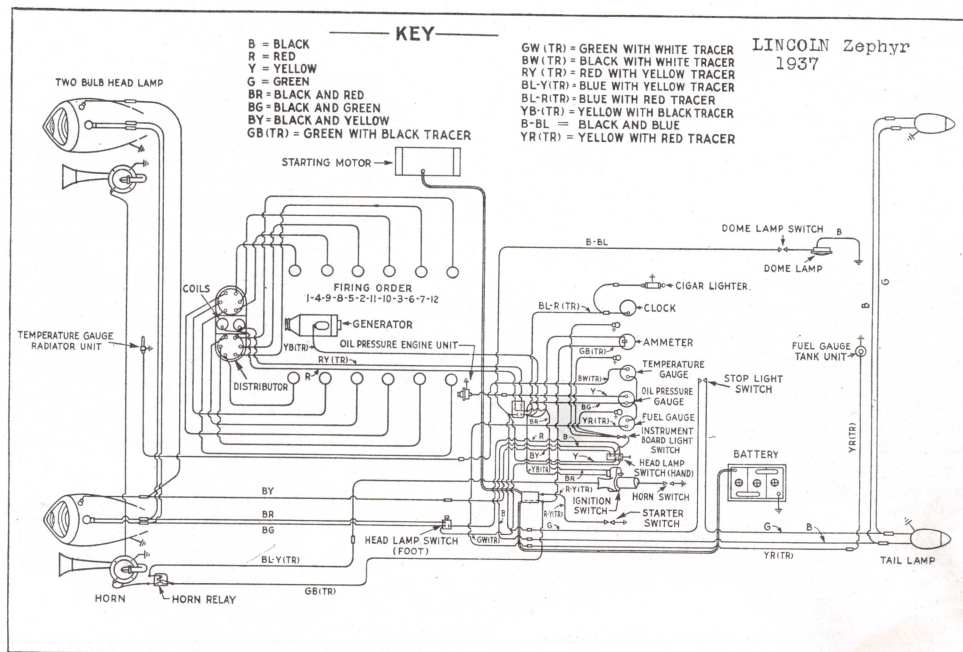
Distributor—Own.  
Coil—Own (2).  
Distr. Rotation—Counter-clockwise viewed from front.  
Breaker Gap—.014"-.016".  
Brush Spr. Tension—20-24 oz.  
Sp. Plug Gap—.028"-.030".  
Sp. Plug Size—14m/m.  
Manual Advance—None.  
Automatic Adv.—Max. 20° crankshaft.  
Timing—4° before top dead center.  
Coil Amps., Engine Idling—3.2.  
Coil Amps., Engine Stopped—4.2.

### BATTERY

Amps.—100 amp. hour.

### LAMPS

Head—32-32 C. P.  
Park—3 C. P.  
Instrument—3 C. P.  
Fuse—None.  
Dome—15 C. P.  
Stop and Tail—3 C. P. and 21 C. P.





# Nash Ambassador 6, 1938

## ENGINE

### DATA

No. of Cylinders—6.  
Bore—3 $\frac{3}{8}$ ".  
Stroke—4 $\frac{3}{8}$ ".  
Taxable H. P.—27.34.  
Displacement—234.8.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—105 at 3400 r.p.m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—60 links,  $\frac{9}{16}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Coincidental sprocket marking.  
Bearings—6.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.010".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—20 qts.  
Pump Drive—Generator shaft.  
Belt Size—32" V.  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—7.  
Material—Babbitt, steel-backed.  
End Thrust Taken On—Center bearing.  
End Clearance—.004".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Marvel.  
Type—Single downdraft.  
Adjustment—Idle—turn in lean; out to rich.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—30 lbs. at 20 m.p.h.  
Adjustment—Not given.

Oil { Above 80° F. .... S.A.E. 30  
      40°-80° F. .... S.A.E. 20  
      -10°-40° F. .... S.A.E. 10W.  
      Below -10° F. .... S.A.E. 10W.  
      plus 10% kerosene.

### PISTONS

Material—Bohn alum., split skirt, steel strut.  
Clearance—Top—.022".  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0001" average.  
Fit in Rod—.0001" average.

### VALVES AND TAPPETS

Dia. Exhaust—1.593".  
Dia. Intake—1.75".  
Stem Dia.—.3725".  
Seat Angle—45°.  
Seat Width—Int.,  $\frac{1}{16}$ "; Exh.,  $\frac{3}{32}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—Min. .008".  
Exhaust—.015".  
(Same for valve timing).  
Guides Removable—Yes.  
Spring Pressure—Not given.  
Inner 2"; Outer 12 $\frac{1}{32}$ " free length.

## CHASSIS

### FRONT AXLE

Caster—1 $\frac{1}{2}$ ".  
Camber—1 $\frac{1}{2}$ ".  
Toe-in—0".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.007".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—4 lbs.

### TRANSMISSION

Make and Type—Own.  
Main Shaft Bearing Type and No.—Taper roller.  
Countershaft Bearing Type and No.—Plain.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Woven and moulded.  
Lining Size—22" x 2" x  $\frac{1}{32}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—53% front; 47% rear.

### CLUTCH

Type—B. & B. single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Plain.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded "U."

### STEERING GEAR

Type—Gemmer.  
Adjustments  
Column end play—shims lower cover.  
Cross-shaft end play—adjusting screw.  
Mesh—Not given.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAB 4076.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 2700 r.p.m.  
Lock Torque—21 $\frac{1}{2}$  ft. lbs., 750 amps., 4.0 volts.  
Brush Spring Tension—42-53 oz., with new brushes.

### GENERATOR

Make—Auto-Lite—GCM 4803-B.  
Drive—Belt.  
Regulation—Third brush (voltage regulator optional).  
Thermostat—None.  
Output, cold—18 amps., 8.0 volts, 2600 r.p.m.  
Output, hot—18 amps., 8.0 volts, 2800 r.p.m.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0-7.5 volts at 780 r.p.m. armature speed (9 m.p.h.).  
Amps. Discharge to Open—1.5-2.5.  
Field Fuse—Not specified.

### IGNITION

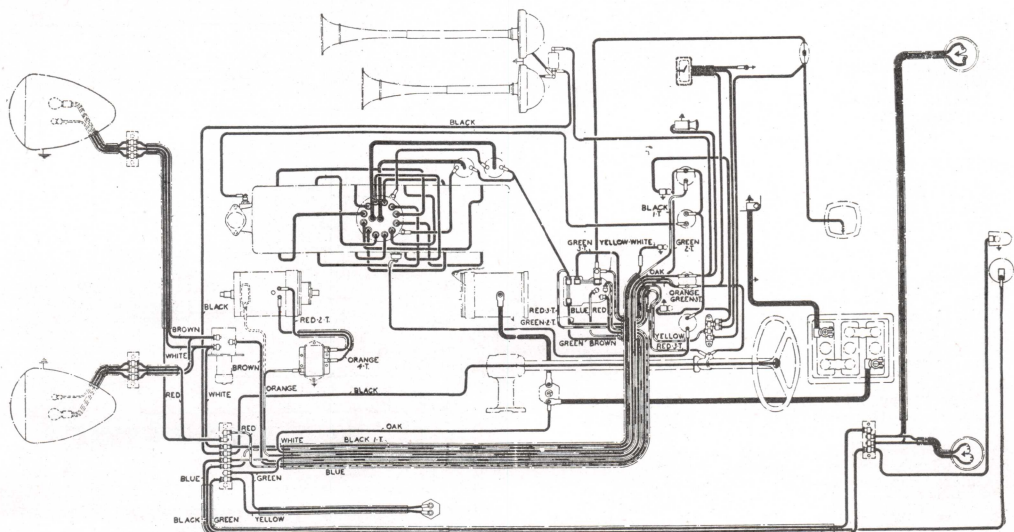
Distributor—Auto-Lite—IGE—4018 "Twin Ign."  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise, viewed from top.  
Breaker Gap—.020" (synchronize points).  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—A. C. "45"—14 m/m.  
Manual Advance—None.  
Automatic Advance—26°.  
Timing—4° before top dead center ("IGN" mark on front flywheel).  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—5.0 amps.

### BATTERY

Amps.—105 amp. hr.

### LAMPS

Head—32-32 c. p.—6-8 v.  
Park—3 c. p.—6-8 v.  
Instrument—3 c. p.—6-8 v.  
Fuse—Not specified.  
Dome—6 c. p.—6-8 v.  
Stop and Tail—3-21 c. p.—6-8 v.





# Nash Ambassador 8, 1938

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{8}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable H. P.—31.25.  
Displacement—260.8.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—115 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—62 links,  $\frac{9}{16}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Coincidental sprocket marking.  
Bearings—6.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.010".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—18 qts.  
Pump Drive—Generator shaft.  
Belt Size—32° V.  
Belt Adjustment—Fan bracket.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—9.  
Material—Babbitt, steel-backed.  
End Thrust Taken On—Center bearing.  
End Clearance—.004".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-7."  
Type—Dual downdraft.  
Adjustment—Idle—turn in to lean; out to rich.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—30 lbs. at 20 m.p.h.  
Adjustment—Not given.  
Oil { Above 80° F. .... S.A.E. 30  
      40°-80° F. .... S.A.E. 20  
      —10°-40° F. .... S.A.E. 10W.  
      Below -10° F. .... S.A.E. 10W.  
      plus 10% kerosene.

### PISTONS

Material—Bohn alum., split skirt, steel strut.  
Clearance—Top—.020".  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0001".  
Fit in Rod—.0001".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.—.375".  
Seat Angle—45°.  
Seat Width—Int.,  $\frac{1}{16}$ "; Exh.,  $\frac{3}{32}$ ".  
Tappet Type—Not given.  
Clearance—Hot:  
  Intake—.015".  
  Exhaust—.015".  
  (Same for valve timing).  
Guides Removable—Yes.  
Spring Pressure—Not given.  
Free length—Inner, 2";  
Outer,  $1\frac{1}{32}$ ".

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ ".  
Camber— $1\frac{1}{2}$ ".  
Toe-in—0".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.007".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—6 lbs.

### TRANSMISSION

Make and Type—Own.  
Main Shaft Bearing Type and No.—Not given.  
Countershaft Bearing Type and No.—Not given.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Woven and moulded.  
Lining Size— $2\frac{1}{4}$ " x  $\frac{7}{8}$ ".  
Adjustments—Eccentric for centralizing.  
  Adjusting screw for clearance.  
  Adjustable anchor.  
Clearance—Top—.010".  
  Bottom—.010".  
Brake Effort—53% front; 47% rear.

### CLUTCH

Type—B. & B. single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Graphite bronze.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded "U."

### STEERING GEAR

Type—Gemmer.  
Adjustments  
  Column end play—shims.  
  Cross-shaft end play—adjusting screw.  
  Mesh—Not given.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAB 4054.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque— $21\frac{1}{2}$  ft. lbs., 750 amps., 4.0 volts.  
Brush Spring Tension—44-56 oz.

### GENERATOR

Make—Auto-Lite—GCO 4802B.  
Drive—Belt.  
Regulation—Voltage and current regulator.  
Thermostat—Not specified.  
Output, cold—28 amps., 8.0 volts, 1800 r.p.m.  
Output, hot—28 amps., 8.0 volts, 2200 r.p.m.  
Brush Spring Tension—Worn, 24 oz.; new, 36 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0-7.5 volts at 9.6 m.p.h.  
Amps. Discharge to Open—1.5-2.5.  
Field Fuse—Not specified.

### IGNITION

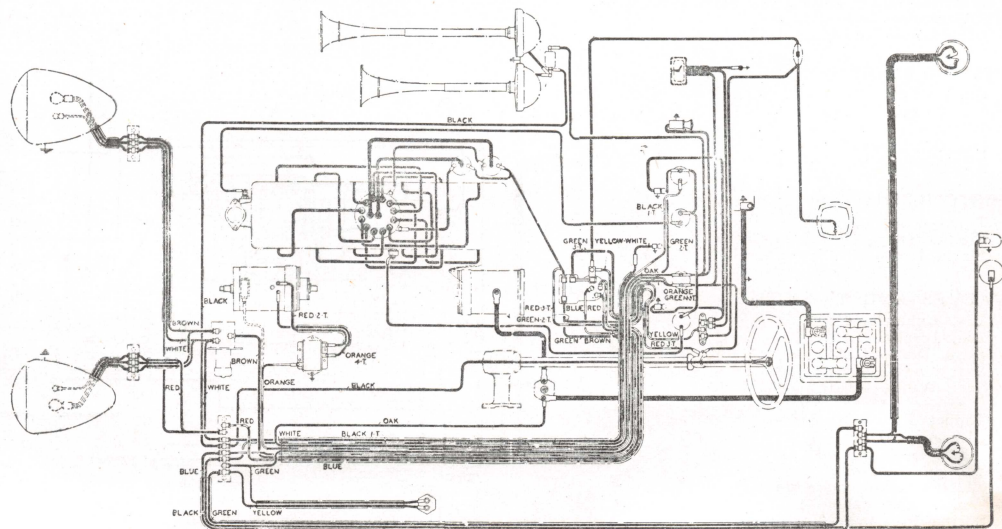
Distributor—Auto-Lite—IGK 4102.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—A. C. "45"—14 m/m.  
Manual Advance—None.  
Automatic Advance—24°.  
Timing—9° before top dead center ("IGN" mark on front flywheel).  
Coil Amps., Engine Idling—2.5.  
Coil Amps., Engine Stopped—4.0.

### BATTERY

Amps.—120 amp. hr.

### LAMPS

Head—32-32 c. p.—6-8 v.  
Park—3 c. p.—6-8 v.  
Instrument—3 c. p.—6-8 v.  
Fuse—Not specified.  
Dome—6 c. p.—6-8 v.  
Stop and Tail—3-21 c. p.—6-8 v.



This diagram applies, except ignition and clutch pedal starter control



# Nash Ambassador 6, 1937

MODEL 3720

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{3}{8}$ ".  
Stroke— $4\frac{3}{8}$ ".  
Taxable HP.—27.34.  
Displacement—234.8 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. HP.—95 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—60 links,  $\frac{9}{16}$ " wide,  $\frac{3}{4}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.008".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Shaft.  
Belt Size— $32^{\circ}V-47 \times 2\frac{5}{32}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—7.  
Material—Steel backed babbit.  
End Thrust Taken On—No. 4 bearing.  
End Clearance—.004".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "Ex-2."  
Type—Down draft single.  
Adjustment—Idle only; in gives leaner mixture; out, richer mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—Normal 25-35 lbs.  
Adjustment—Not given.  
Oil {  $32^{\circ}-95^{\circ}F$ —S. A. E. No. 30.  
           $10^{\circ}-75^{\circ}F$ —S. A. E. No. 20.  
           $-10^{\circ}-32^{\circ}F$ —S. A. E. No. 10-W.

### PISTONS

Material—Alum. alloy with invar strut.  
Clearance—Top—.020".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.010".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $1\frac{1}{8}$ " and  $1\frac{5}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Push fit, piston heated.  
Fit in Rod—Push fit, parts cold.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{19}{32}$ ".  
Dia. Intake— $1\frac{1}{4}$ ".  
Stem Dia.—.372".  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{1}{16}$ "— $\frac{3}{32}$ ".  
Tappet Type—Not given.  
Clearance—Hot: Intake—.008".  
                  Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—Not given.

## CHASSIS

### FRONT AXLE

Caster— $1^{\circ}-2^{\circ}$ .  
Camber— $0^{\circ}-1\frac{1}{2}$ ".  
Toe-in— $0^{\circ}-\frac{1}{8}$ ".  
Kingspin Angle— $7^{\circ}$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper Roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.006".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—4 lbs.

### TRANSMISSION

Make and Type—Own synchro-mesh  
Main Shaft Bearing Type and No.—Not given.  
Countershaft Bearing Type and No.—Not given.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{1}{16} \times 2 \times 3\frac{1}{16}$ ".  
Adjustments—Eccentric for centralizing shoes. Adjusting screw for clearance. Adjustable anchor.  
Clearance—Top—.010".  
                  Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—B and B single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Graphite bronze.  
Throwout Bearing Type and No.—AET. A899.

### SPRINGS

Type Front—Semi-elliptic.  
Type rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims at lower cover. Cross shaft end play—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque—21 ft. lbs., 750 amps., 4 volts.  
Brush Spring Tension—42-53 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, Cold—22 amps., 8 volts, 2800 r.p.m.  
Output, hot—18 amps., 8 volts, 2800 r.p.m.  
Brush Spr. Tension—Worn, 24 oz.; new 36 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—7 volts at 9 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—5 amps.

### IGNITION

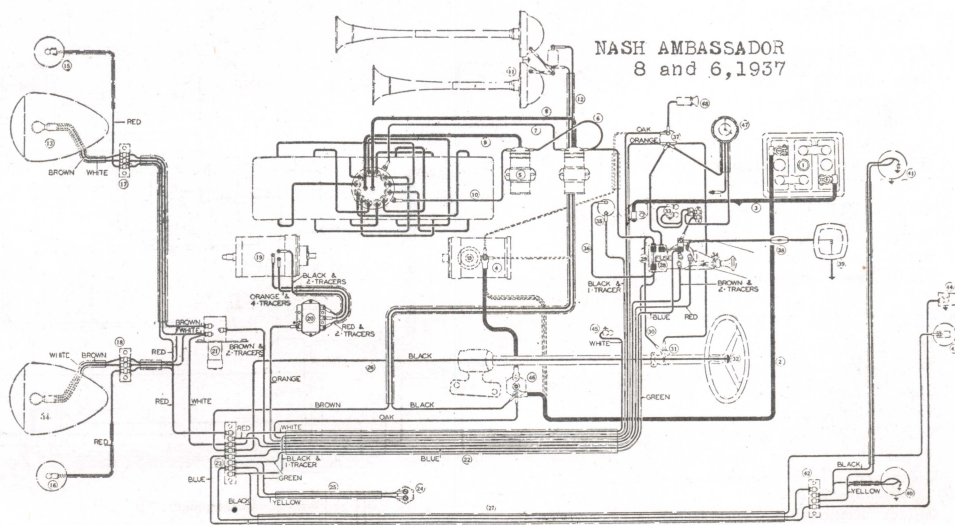
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spr. Tension—16-20 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—A. C. 14 m/m "K-12."  
Manual Advance—None.  
Automatic Adv.— $18^{\circ}$ .  
Timing—Set timing to IGN mark on vibration dampener—15 degrees before top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—100 Amp. hours.

### LAMPS

Head—32-32 CP., 6-8V., Flange type.  
Park—3 CP., 6-8V., S. C.  
Instrument—3 CP., 6-8V., S. C.  
Dome—6 CP., 6-8V., S. C.  
Stop and Tail—3-21 CP., DC., DF.





# Nash Ambassador 8, 1937

MODEL 3780

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{8}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable HP.—31.25.  
Displacement—260.8 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. HP.—105 at 3400 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—62 links,  $\frac{9}{16}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers  
Bearings—Not given.  
End Thrust Taken On—Not given.  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.008".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—18 qts.  
Pump Drive—Shaft.  
Belt Size—28° V-48  $\frac{3}{4}$ " x  $25\frac{5}{32}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—9.  
Material—Steel backed babbit.  
End Thrust Taken On—No. 5 bearing.  
End Clearance—.004".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-7."  
Type—Down draft dual.  
Adjustment—Idle only, in gives leaner mixture; out, richer mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—Normal 25-35 lbs.  
Adjustment—Not given.

Oil {  $32^{\circ}$ - $95^{\circ}$  F.—S. A. E. No. 30.  
           $10^{\circ}$ - $75^{\circ}$  F.—S. A. E. No. 20.  
           $-10^{\circ}$ - $32^{\circ}$  F.—S. A. E. No. 10-W.

### PISTONS

Material—Alum. alloy with invar strut.  
Clearance—Top—.018".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.010".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $1\frac{1}{8}$ " and  $1\frac{3}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Push fit piston heated.  
Fit in Rod—Push fit, parts cold.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.—.372".  
Seat Angle—45°.  
Seat Width—Not given.  
Tappet Type—Not given.  
Clearance—Hot: Intake—.008".  
                  Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—Not given.

## CHASSIS

### FRONT AXLE

Caster— $1^{\circ}$ - $2^{\circ}$ .  
Camber— $0^{\circ}$ - $1\frac{1}{2}^{\circ}$ .  
Toe-in— $0^{\circ}$ - $\frac{1}{8}$ ".  
Kingpin Angle—7°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.006".  
Diff. Bearing Type—Taper roller.  
Adjustment—Not given.  
End Play—Not given.  
Lubricant Capacity—Housing—6 lbs.

### TRANSMISSION

Make and Type—Own, synchro-mesh.  
Main Shaft Bearing Type and No.—Not given.  
Countershaft Bearing Type and No.—Not given.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size—24" x  $2\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments  
Eccentric for centralizing shoes.  
Adjusting screw for clearance.  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—B. & B. single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Graphite bronze.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims at lower cover.  
Cross-shaft end play—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque—21 ft. lbs., 750 amps., 4 volts.  
Brush Spring Tension—44-56 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—28 amps., 8 volts, 1650 r.p.m.  
Output, hot—28 amps. at 8 volts, 1800 r.p.m.  
Brush Spring Tension—Worn 24 oz.; new 36 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7 volts at 12 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

### IGNITION

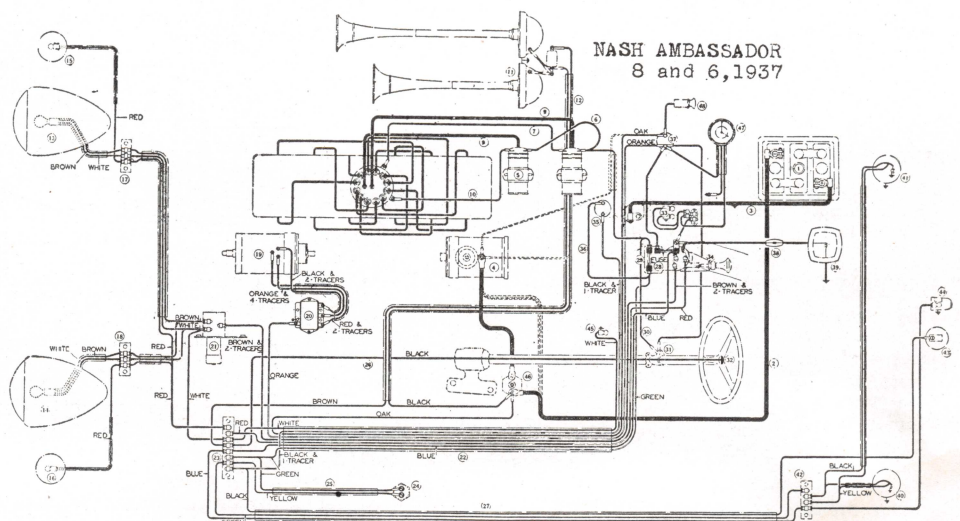
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.013"-.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—A. C. 14 m/m. "K-12".  
Manual Advance—None.  
Automatic Advance—30°.  
Timing—Set timing to I. G. N. mark on vibration dampener—15 degrees before top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—116 amp. hr.

### LAMPS

Head—32-32 C. P., 6-8 v., flange base type.  
Park—3 C. P., 6-8 v., single contact.  
Instrument—3 C. P., 6-8 v., single contact.  
Fuse—Not given.  
Dome—6 C. P., 6-8 v., single contact.  
Stop and Tail—3-21 C. P., D. C., D. F.









# Nash-Lafayette 400, 1937

MODEL 3710

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{3}{8}$ ".  
Stroke— $4\frac{3}{8}$ ".  
Taxable HP.—27.34.  
Displacement—234 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. HP.—90 at 3400 r.p.m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—60 links,  $\frac{1}{16}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—Not given.

### CONNECTING RODS

End Clearance—.008".  
Dia. Clearance—.002".

### COOLING SYSTEM

Capacity—20 qts.  
Belt Size— $32^{\circ}$  V-47x $2\frac{5}{8}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—7.  
Material—Steel backed babbitt.  
End Thrust Taken On—No. 4 bearing.  
End Clearance—.004"-.006".  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EX22."  
Type—Downdraft single.  
Adjustment—Idle only; in gives leaner mixture; out, richer mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—Normal 25-35 lbs.  
Adjustment—Not given.

Oil {  $32^{\circ}$ - $95^{\circ}$  F.—S. A. E. No. 30.  
       $10^{\circ}$ - $75^{\circ}$  F.—S. A. E. No. 20  
       $-10^{\circ}$ - $32^{\circ}$  F.—S. A. E. No. 10-W.

### PISTONS

Material—Alum. alloy with invar strut.  
Clearance—Top—.022".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.010".  
No Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $1\frac{1}{8}$ " and  $1\frac{3}{8}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—.0001" push fit piston heated.  
Fit in Rod—.0001" push fit, cold.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.—.341".  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{1}{16}$ ".  
Clearance—Hot: Intake—.015".  
Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—Not given.

## CHASSIS

### FRONT AXLE

Caster— $1^{\circ}$ - $2^{\circ}$ .  
Camber— $0^{\circ}$ - $1\frac{1}{2}^{\circ}$ .  
Toe-in— $0^{\circ}$ - $\frac{1}{8}$ ".  
Kingpin Angle— $7^{\circ}$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.006".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—4 lbs.

### TRANSMISSION

Make and Type—Synchro-mesh.  
Main Shaft Bearing Type and No.—  
Timken 359S-352A and 2793-2720.  
Countershaft Bearing Type and No.—  
Bronze.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{1}{16}$ "x $2$ "x $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing shoes. Adjusting screws for clearance.  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—47% front; 53% rear.

### CLUTCH

Type—B and B single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Graphite bronze.  
Throwout Bearing Type and No.—AET. A899.

### Springs

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims at lower cover. Cross shaft end play—adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5.5 volts, 3700 r.p.m.  
Lock Torque—21 ft. lbs., 750 amps., 4 volts.  
Brush Spring Tension—42-53 oz. with new brushes.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—22 amps., 8 volts, 2800 r.p.m.  
Output, hot—18 amps., 8 volts, 2800 r.p.m.  
Brush Spr. Tension—22-26 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—7 volts at 10 m.p.h.  
Amps Discharge to Open—2.0.  
Field Fuse—7.5 amps.

### IGNITION

Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spr. Tension—16-20 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—A. C. 18 m/m "G-8."  
Manual Advance—None.  
Automatic Adv.— $24^{\circ}$ .  
Timing—Set timing to IGN mark on vibration dampener—10 degrees before top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopper—5.0.

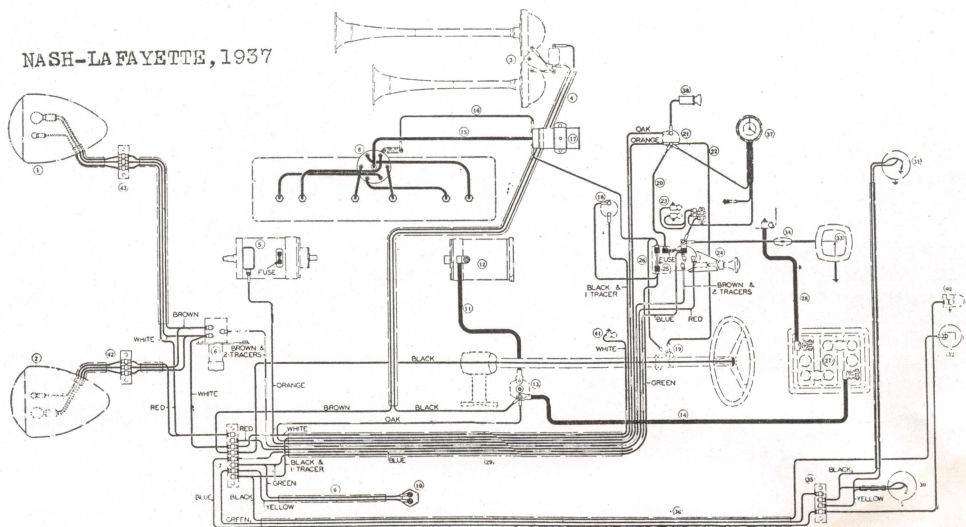
### BATTERY

Amps.—100 amp. hour.

### LAMPS

Head—32-32 CP., 6-8 V., Flange type.  
Park—3 CP., 6-8V., S. C.  
Instrument—3 CP., 6-8V., S. C.  
Dome—6 CP., 6-8V., S. C.  
Stop and Tail—3-21 CP., 6-8V., D.C., D.F.

NASH-LAFAYETTE, 1937





# Lafayette, 1936

MODEL 3610

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—25.35.  
Displacement—217.76 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—83 at 3200 r.p.m.

### CAMSHAFT

Drive—Diamond chain.  
Chain Data—60 links,  $\frac{9}{16}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—6.  
End Thrust Taken On—Spring plunger.  
Wearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.008"-.012".  
Dia. Clearance—.002"-.003".

### COOLING SYSTEM

Capacity—19 qts.  
Pump Drive—Belt.  
Belt Size—Not given.  
Belt Adjustment—Fan bracket.  
Pump Pack Adj.—Thread

### CRANKSHAFT

No. Bearings—7.  
Material—Steel-backed, babbitt lined.  
End Thrust Taken On—Center bearing.  
End Clearance—.004"-.007"  
Dia. Clearance—.002".

### FUEL SYSTEM

Carburetor Make—Marvel.  
Type—Downdraft.  
Adjustment—Idle—In, lean; out, rich.  
High speed, fixed.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—20 lbs. at 20 m.p.h.  
Adjustment—Not given

Oil {  $32^{\circ}$  F.- $95^{\circ}$  F. .... S.A.E. No. 30  
10" F.- $75^{\circ}$  F. .... S.A.E. No. 20W.  
-10" F.- $32^{\circ}$  F. .... S.A.E. No. 10W.

### PISTONS

Material—Alum. alloy, invar strut.  
Clearance—Top—.020"  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—.010"-.025".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $1\frac{1}{8}$ ",  $1\frac{1}{16}$ ".

### PISTON PINS

Type—Not given.  
Fit in Piston—Light push fit, piston heated.  
Fit in Rod—Light push fit, parts cold.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem. Dia.—Not given.  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.015".  
Exhaust—.015".  
Guides Removable—Yes.  
Spring Pressure—Not given

## CHASSIS

### FRONT AXLE

Caster— $2^{\circ}.4^{\circ}$ .  
Camber— $0^{\circ}.1\frac{1}{2}^{\circ}$ .  
Toe-in— $0\frac{1}{4}$ " max.  
Kingpin Angle— $7^{\circ}$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Spiral bevel, semi-floating.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Zero.  
Lash—Not given.  
Diff Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—3 lbs. S.A.E.,  
No. 90 E. P.

### TRANSMISSION

Make and Type—Synchro-mesh.  
Main Shaft Bearing Type and No.—Taper roller.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $22\frac{1}{16}$ " x 2" x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Anchor—sliding type.  
Clearance  
Top—.010".  
Bottom—.010".  
Brake Effort—Not given.

### CLUTCH

Type—B. & B.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Durex.  
Throwout Bearing Type and No.—Nice  
5015-1.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—U-type, threaded.

### STEERING GEAR

Type—Gemmer worm and roller.  
Adjustments  
Column end-play, shims at bottom.  
Cross-shaft, adjusting screw.  
Mesh, shims on cross-shaft.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite, MAD 4076.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5.5 volts at 3700 r.p.m.  
min.  
Lock Torque— $15\frac{1}{2}$  ft. lbs. at 575 amps., 3 volts.  
Brush Spring Tension—42-53 oz. with new brushes.

### GENERATOR

Make—Auto-Lite, GAR 4601-5.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—18 amps. at 8.0 volts at 24 m.p.h.  
Output, hot—14 amps. at 8.0 volts at 24 m.p.h.  
Brush Spring Tension—22-36 oz.  
Rotation—Counter-clockwise, viewing drive end.  
Cutout to Close—7 volts at 9 m.p.h.  
Amps. Discharge to Open—0.5-2.5.  
Field Fuse— $7\frac{1}{2}$  amps.

### IGNITION

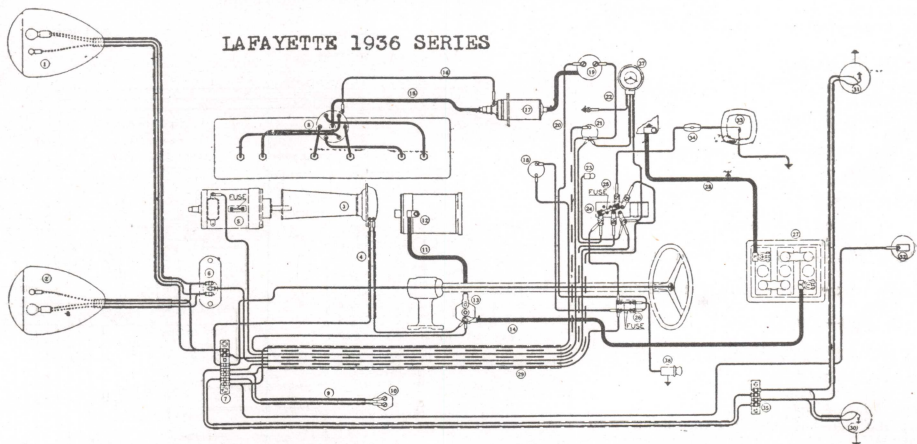
Distributor—Auto-Lite, IGB 4317.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion C-15.  
Manual Advance—None.  
Automatic Adv.— $20^{\circ}$  engine.  
Timing— $10^{\circ}$  before top dead center.  
Coil Amps., Engine Idling—2.5.  
Coil Amps., Engine Stopped—4.0.

### BATTERY

Amps.—U. S. I. amp. hr. 100.

### LAMPS

Head—32-32 c. p., 6-8 volt.  
Park—3 c. p., s. c., 6-8 volt.  
Instrument—3 c. p., s. c., 6-8 volt.  
Fuse—20 amps.  
Dome—4 c. p., d. c., 6-8 volt.  
Stop and Tail—3-21 c. p., d. f., 6-8 volt.



WIRING DIAGRAM & WIRING CHART

- |                                  |  |                                       |                                    |
|----------------------------------|--|---------------------------------------|------------------------------------|
| 1—Head Lamp R. H.                | 11—Starting Switch to Starting Motor Cable | 18—Gasoline Gauge                     | 28—Battery to Ground Cable         |
| 2—Head Lamp L. H.                | 12—Starting Motor                          | 19—Ignition Switch                    | 29—Main Wiring Harness             |
| 3—Horn                           | 13—Starter Switch                          | 20—Ignition Switch to Fuse Block Wire | 30—Tail & Stop Light L. H.         |
| 4—Horn Wire Harness              | 14—Neg. Bat. to Starting Motor Cable       | 21—Ammeter                            | 31—Tail & Stop Light R. H.         |
| 5—Generator                      | 15—Coil to Distributor—High Ten Wire       | 22—Ammeter to Ignition Switch Wire    | 32—Gasoline Gauge—Tank Unit        |
| 6—Head Lamp Foot Switch          | 16—Coil to Distributor—Low Ten Wire        | 23—Instrument Panel Light             | 33—Dome Light                      |
| 7—Junction Block                 | 17—Ignition Coil                           | 24—Light Switch                       | 34—Dome Light Switch               |
| 8—Distributor                    |  | 25—Fuse                               | 35—Junction Block—Tail Light Wire  |
| 9—Stop Light Switch Wire Harness |  | 26—Fuse Block                         | 36—Tail & Stop Light Wire          |
| 10—Stop Light Switch             |  | 27—Battery                            | 37—Clock—Special Equipment         |
|                                  |  |                                       | 38—Cigar Lighter—Special Equipment |



# Oldsmobile 6, 1938

MODEL F-38

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{7}{16}$ ".  
Stroke— $4\frac{1}{8}$ ".  
Taxable H. P.—28.4.  
Displacement—229.7 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—95 at 3400 r.p.m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—47 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other in a line through shaft centers.  
Bearings—4, removable bushings.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.002"-.004".

### CONNECTING RODS

End Clearance—.0055"-.0105".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Fan belt.  
Belt Size— $32\frac{1}{2}$ "V— $44\frac{1}{16}$ " x  $1\frac{3}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed, babbitt-lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter "W-1"—388S.  
Type—Single downdraft.  
Adjustment—With automatic transmission, idle,  $\frac{1}{2}$  to 1 turn open. With standard transmission, idle, 1 to  $1\frac{1}{2}$  turns open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—Dry 6 qts.  
Oil Pressure—27 lbs. to 33 lbs.  
Adjustment—Non-adjustable.

Oil { Not lower than 32°F.....20W.  
or S.A.E. 20.  
As low as 10°F above zero.....20W.  
As low as 10°F below zero.....10W.  
Below 10°F below zero.....10W.  
plus 10% kerosene.

### PISTONS

Material—Alum. T-slot, oxide finish.  
Clearance—Top—Land, .026" nominal.  
Clearance—Bottom—.0013"-.0018".

### PISTON RINGS

Gap—Comp. .007"-.014"; oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston  
Plain boss—.0001" loose to .0002" tight.  
Lock screw boss—.0002" to .0005" tight.  
Fit in Rod—.0003"-.0006".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{7}{16}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.— $1\frac{1}{16}$ ".  
Seat Angle—Int., 30°; exh., 45°.  
Seat Width—Int., .042"-.052"; exh., .070"-.085".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.008".  
Exhaust—.011".  
Guides Removable—Yes.  
Spring Pressure—46 lbs. at  $2\frac{1}{2}$ "  
94 lbs. at  $1\frac{1}{4}$ ".  
Out of engine  $2\frac{1}{4}$ ".

## CHASSIS

### FRONT AXLE

Caster—0°.— $\frac{3}{4}$ ".  
Camber— $\frac{1}{8}$ "-1".  
Toe-in— $\frac{1}{8}$ "- $\frac{3}{16}$ ".  
Kingpin Angle—4°-51'-10".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—N. D. Ball No. 905306  
and Hyatt roller No. 107391.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.005"-.008".  
Diff. Bearing Type—Hyatt barrel roller No. 127861.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $2\frac{1}{2}$  pts.

### TRANSMISSION

Make and Type—3-speed, own; automatic type optional.  
Main Shaft Bearing Type and No.—N. D. Ball No. 907507 and 907506.  
Countershaft Bearing Type and No.—Bushings.

### BRAKES

Type—Hydraulic.  
Lining Type—Primary, moulded; secondary, woven.  
Lining Size— $21\frac{1}{16}$ " x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Notched adjusting screw for clearance.  
Eccentric anchor pin.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—B. & B. single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No. 907109.  
Throwout Bearing Type and No.—Graphite.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—"U," threaded.

### STEERING GEAR

Type—Saginaw worm and roller.  
Adjustments—Column end play—adjusting nut at bottom.  
Cross-shaft end play—adjusting screw mesh—eccentric sleeve.  
Lubricant—Chassis lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy—739-G.  
Drive—Manual gear.  
Rotation—Clockwise, from drive end.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz. (4 brushes).

### GENERATOR

Make—Delco-Remy—936-T.  
Drive—Fan belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold— $26\frac{1}{2}$ -30½ amps., 8 volts, 3400 r.p.m. armature.  
Output, hot—24.6-28.6 amps., 8 volts, 3400 r.p.m. armature.  
Brush Spring Tension—Main 22-26 oz.; 3rd brush 16-20 oz.  
Rotation—Counter-clockwise, viewed from commutator end.  
Cutout to Close—7.5-8.5 volts at 9.8 m.p.h.  
Amps. Discharge to Open—0-2.0 amps.  
Field Fuse—None.

### IGNITION

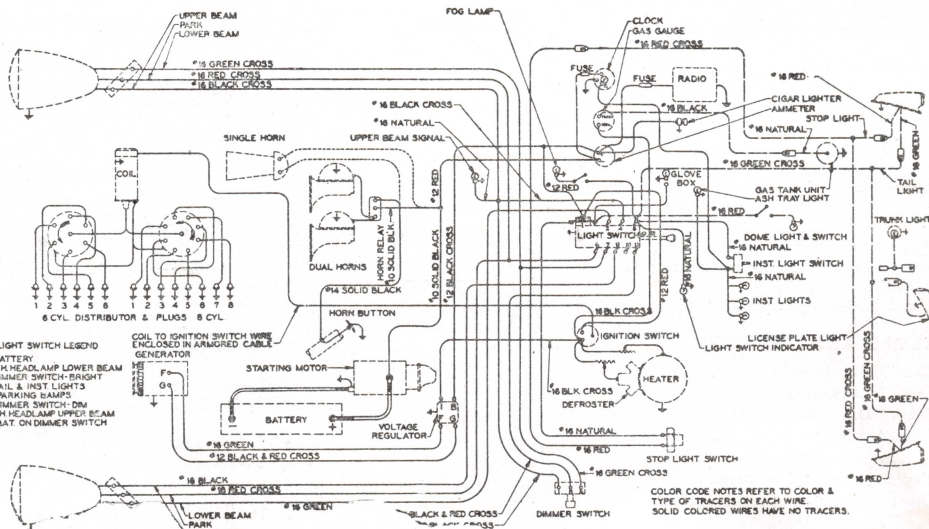
Distributor—Delco-Remy—647-F.  
Coil—Delco-Remy—539-R.  
Distr. Rotation—Clockwise, viewed from top.  
Breaker Gap—.020".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.040".  
Sp. Plug Size—14 m/m A. C. m/45— $1\frac{1}{16}$ " hex.  
Manual Advance—None.  
Automatic Advance—25° max.  
Vacuum Advance—34° max.  
Timing—Top dead center, spark control in normal position.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—4.5 amps.

### BATTERY

Amps.—94 amp. hour.

### LAMPS

Head—No. 2320L.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—Not given.  
Dome—No. 81.  
Stop and Tail—No. 1154.



Oldsmobile 6, F-38 8,L-38



# Oldsmobile 8, 1938

## MODEL L-38

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $3\frac{7}{8}$ "  
Taxable H. P.—33.8.  
Displacement—257.1 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—110 at 3600 r.p.m.

#### CAMSHAFT

Drive—Link belt chain.  
Chain Data—47 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—5, removable bushings.  
End Thrust Taken On—Spring plunger.  
Bearing Clearance—.002"-.004".

#### CONNECTING RODS

End Clearance—.0055"-.0105".  
Dia. Clearance—.001"-.003".

#### COOLING SYSTEM

Capacity—21 qts.  
Pump Drive—Fan belt.  
Belt Size— $32^{\circ}\text{V}-441\frac{1}{16} \times 1\frac{1}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed, babbitt-lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.001"-.003".

#### FUEL SYSTEM

Carburetor Make—Carter "WDO"—389S.  
Type—Dual downdraft.  
Adjustment—Idle adjustment,  $\frac{1}{2}$ - $1\frac{1}{4}$  turns open.  
Fuel Delivery—A. C. camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—Dry, 7 qts.  
Oil Pressure—27 lbs. to 33 lbs.  
Adjustment—Non-adjustable.  
Oil { Not lower than 32° F. .... 20W.  
      or S.A.E. 20.  
      As low as 10° F. above 0 ..... 20W.  
      As low as 10° F. below 0 ..... 10W.  
      Below 10° F. below 0 ..... 10W.  
      plus 10% kerosene.

#### PISTONS

Material—Alum., split skirt, oxide finish.  
Clearance—Top—Land, .026" nominal.  
Clearance—Bottom—.0013"-.0018".

#### PISTON RINGS

Gap—Comp., .009"-.014"; oil, .007"-.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Locked in piston.  
Fit in Piston—  
Plain boss—.0001" loose to .0002" tight.  
Lock screw boss—.0002" loose to .0005" tight.  
Fit in Rod—.0003"-.0006".

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{7}{16}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—Int., 30°; Exh., 45°.  
Seat Width—Int., .042"-.052"; Exh., .070"-.085".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.008".  
Exhaust—.011".  
Guides Removable—Yes.  
Spring Pressure—46 lbs. at  $2\frac{1}{32}$ ".  
94 lbs. at  $1\frac{1}{32}$ ".  
Out of engine, 2 $\frac{5}{8}$ ".

### CHASSIS

#### FRONT AXLE

Caster—0°- $\frac{3}{4}$ ".  
Camber— $\frac{1}{8}$ "- $\frac{1}{4}$ ".  
Toe-in— $\frac{1}{8}$ "- $\frac{3}{16}$ ".  
Kingpin Angle—4°-51'-10".  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—N. D. Ball No. 905306 and Hyatt Roller No. 107391.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.005"-.008".  
Diff. Bearing Type—Hyatt barrel roller No. 127861.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—2 $\frac{1}{2}$  pts.

#### TRANSMISSION

Make and Type—Own, 3-speed; automatic type optional.  
Main Shaft Bearing Type and No.—N. D. Ball No. 907507 and 907506.  
Countershaft Bearing Type and No.—Bushings.

#### BRAKES

Type—Hydraulic.  
Lining Type—Primary, moulded; secondary, woven.  
Lining Size—23.05" x  $1\frac{3}{4}$ " x  $\frac{9}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Notched adjusting screw for clearance.  
Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—55% front, 45% rear.

#### CLUTCH

Type—B. & B. single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—N. D. Ball No. 907109.  
Throwout Bearing Type and No.—Graphite.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—"U," threaded.

#### STEERING GEAR

Type—Saginaw worm and roller.  
Adjustments—Column end play—adjusting nut at bottom.  
Cross-shaft end play—adjusting screw.  
Mesh—eccentric sleeve.  
Lubricant—Chassis lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Delco-Remy—729-J.  
Drive—Manual gear.  
Rotation—Clockwise, from drive end.  
No Load—60 amps., 5.0 volts, 6000 r.p.m.  
Lock Torque—15 ft. lbs., 3.0 volts, 600 amps.  
Brush Spring Tension—24-28 oz. (4 brushes).

#### GENERATOR

Make—Delco-Remy—936-T.  
Drive—Fan belt.  
Regulation—Voltage regulator.  
Thermostat—Not specified.  
Output, cold—26 $\frac{1}{2}$ -30 $\frac{1}{2}$  amps., 8 volts, 3200 r.p.m. armature.  
Output, hot—24.6-26.6 amps., 8 volts, 3400 r.p.m. armature.  
Brush Spring Tension—Main, 22-26 oz.; 3rd brush, 16-20 oz.  
Rotation—Counter-clockwise, viewed from commutator end.  
Cutout to Close—7.5-8.5 volts at 9.8 m.p.h.  
Amps. Discharge to Open—0-2.0 amps.  
Field Fuse—None.

#### IGNITION

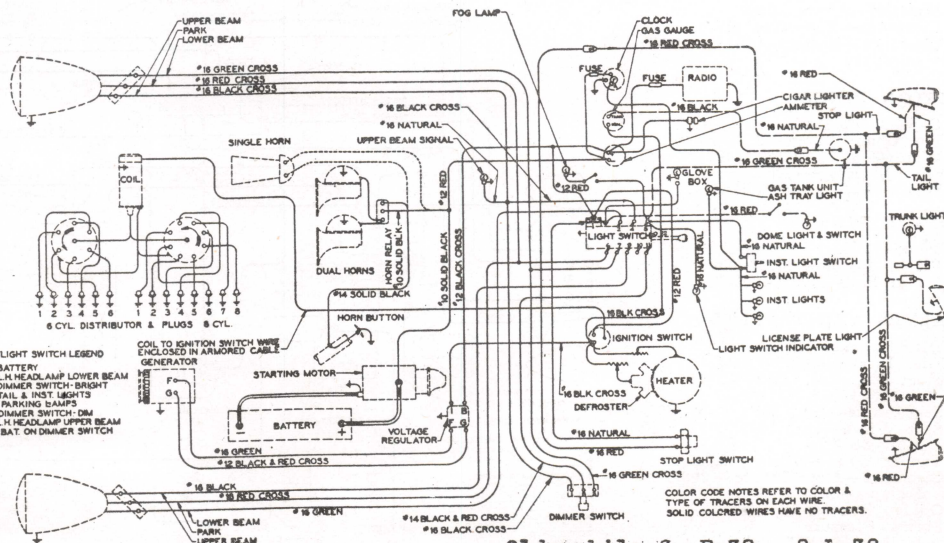
Distributor—Delco-Remy—663-W.  
Coil—Delco-Remy—539-P.  
Distr. Rotation—Clockwise, viewed from top.  
Breaker Gap—.015".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.030".  
Spark Plug Size—14 mm A. C., m/45— $1\frac{3}{16}$ " hex.  
Manual Advance—None.  
Automatic Advance—27 $\frac{1}{2}$ " max.  
Vacuum Advance—33" max.  
Timing—2° or .002" piston travel before top dead center with spark control in normal position.  
Coil Amps., Engine Idling—2.0 amps.  
Coil Amps., Engine Stopped—4.5 amps.

#### BATTERY

Amps.—110 amp. hr.

#### LAMPS

Head—No. 2320L.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—Not given.  
Dome—No. 81.  
Stop and Tail—No. 1154.









# Oldsmobile 8, 1937

MODEL L-37

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ ".  
Stroke— $3\frac{1}{2}$ ".  
Taxable H. P.—33.8.  
Displacement—257.1 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—110 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—47 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on centerline through shafts.  
Bearings—5, Bronze.  
End Thrust Taken On—Spring and plunger.  
Bearing Clearance—.002"-.004".

### CONNECTING RODS

End Clearance—.0055"-.0105".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity—20 qts.  
Pump Drive—Belt.  
Belt Size— $44\frac{1}{16}$ " x  $1\frac{3}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Removable, babbitt lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter WD-O.  
Type—Downdraft, dual.  
Adjustment—Idle  $\frac{3}{4}$ — $1\frac{1}{4}$  turn open. Other jets fixed size.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—25-30 lbs.  
Adjustment—Non-adjustable.  
Oil { Over 40° F. .... S.A.E. No. 30  
      30°-80° F. .... S.A.E. No. 20  
      10°-80° F. .... S.A.E. No. 20W.  
      -10°-40° F. .... S.A.E. No. 10W.  
      -30°-20° F. .... S.A.E. No. 10W. plus  
      10% kerosene.

### PISTONS

Material—Alum. alloy.  
Clearance—Top—Not given.  
Clearance—Bottom—.0013"-.0018" selective.

### PISTON RINGS

Gap—.009"-.014".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ " (.1235"-.1240").  
No. Oil Rings—2.  
Width— $\frac{3}{16}$ " (.1860"-.1865").

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—.0002"-.0005".  
Fit in Rod—.0003"-.0006".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{7}{64}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—Int. .3425"-.3415" Exh. .3415"-.3405".  
Seat Angle—Int. 30°; Exh. 45°.  
Seat Width—Int. .042"-.052"; Exh. .070"-.085".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.008".  
Exhaust—.011".  
Guides Removable—Yes.  
Spring Pressure—  
46 lbs. at  $2\frac{1}{32}$ " valve closed.  
94 lbs. at  $2\frac{1}{32}$ " valve open.

## CHASSIS

### FRONT AXLE

Caster— $\frac{1}{4}$ °-1°.  
Camber— $\frac{1}{8}$ °-1°.  
Toe-in— $\frac{1}{8}$ "- $\frac{3}{16}$ ".  
Kingpin Angle—4°-51'-10".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Double ball and str. roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—Not given.  
Diff. Bearing Type—Hyatt roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $2\frac{1}{2}$  lbs.

### TRANSMISSION

Make and Type—Synchro mesh, helical gears.  
Main Shaft Bearing Type and No.—N. D.  
Ball Nos. 954144 and 907506.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Primary moulded; secondary woven and compressed.  
Lining Size—Primary Shoe  $10\frac{3}{32}$ " x  $1\frac{1}{4}$ " x  $\frac{9}{16}$ ".  
Secondary Shoe  $12\frac{9}{64}$ " x  $1\frac{1}{4}$ " x  $\frac{9}{16}$ ".  
Adjustments—Eccentric for centralizing; Adjusting screw for clearance; Eccentric anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—54.5% front; 45.5% rear.

### CLUTCH

Type—B. & B. No. 10A7—10" single plate.  
Facing Type—Moulded woven.  
Pilot Bearing Type and No.—  
Ball No. 907109.  
Throwout Bearing Type and No.—Graphite.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded.

### STEERING GEAR

Type—Saginaw worm and roller.  
Adjustments—  
Column end play—adjusting screw at bottom.  
Cross shaft—adjusting screw.  
Mesh—eccentric adjustment at bottom.  
Lubricant— $\frac{1}{2}$  lb. chassis lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 729-J.  
Drive—Over-running clutch.  
Rotation—Clockwise from drive end.  
No Load—60 amps., 5 volts, 6000 r.p.m.  
Lock Torque—15 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy 936-T.  
Drive—Fan belt.  
Regulation—External voltage control.  
Thermostat—None.  
Output, cold—22-26 amps., 8.4-8.8 volts.  
Output, hot—20-24 amps., 8.4-8.8 volts.  
Brush Spr. Tension—Main 22-26 oz.; Third brush 16-20 oz.  
Rotation—Counter-clockwise viewed from commutator end.  
Cutout to close—6.5-7.25 volts.  
Amps. Discharge to Open—3.0 max.  
Field Fuse—None.

### IGNITION

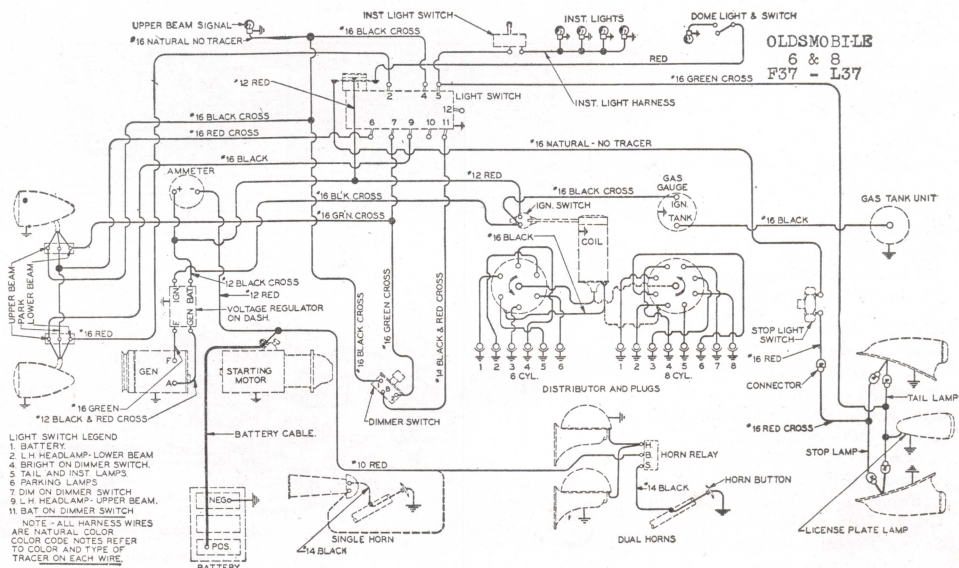
Distributor—Delco-Remy 663-W.  
Coil—Delco-Remy 539-P.  
Distr. Rotation—Clockwise, viewed from top.  
Breaker Gap—.015".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.030".  
Spark Plug Size—A. C. "K-9" 14 m/m.  
Manual Advance—Full automatic.  
Automatic Adv.—28° max. at 4000 r.p.m.  
Vacuum Adv.—15° max. at 1200 r.p.m.  
Timing—2° or .002" piston travel before top dead center.  
Coil Amps., Engine Idling—4.5.  
Coil Amps., Engine Stopped—2.0.

### BATTERY

Amps.—110 amp. hr.

### LAMPS

Head—No. 2320.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—None.  
Dome—No. 81.  
Stop and Tail—No. 1154.









# Packard 8, 1938

SERIES 1603, 1604, 1605

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ ".  
Stroke—5".  
Taxable H. P.—32.5.  
Displacement—320.0 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—130 at 3200 r.p.m.

### CAMSHAFT

Drive—Morse No. 36825.  
Chain Data—70 links,  $1\frac{1}{2}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—8, steel-backed babbitt.  
End Thrust Taken On—Front end.  
End play—.001"-.004".  
Bearing Clearance—.0015"-.0035".

### CONNECTING RODS

End Clearance—.003"-.005".  
Dia. Clearance—.001"-.0015".

### COOLING SYSTEM

Capacity—5 gals.  
Pump Drive—Fan belt.  
Belt Size—42" V, 48 $\frac{3}{4}$ " O.D. x 1".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—9.  
Material—Babbitt lined, steel shell.  
End Thrust Taken On—No. 7 bearing.  
End Clearance—.003"-.005".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Duplex downdraft.  
Adjustment—Turn in to lean, out to enrich mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—8 qts.  
Oil Pressure—50 lbs. at normal speed.  
Adjustment—Thread.  
Oil { Below -10° F. .... S.A.E. 10W.  
      plus 10% kerosene.  
      -10° F. .... S.A.E. 10W.  
      +10° F. .... S.A.E. 20W.  
      +32° F. .... S.A.E. 30  
      Average 90° F. .... S.A.E. 40

### PISTONS

Material—Autothermic alum., with strut.  
Clearance—Top—Not specified.  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—All rings .007"-.015".  
No. Comp. Rings—2.  
Width—1 Perfect Circle No. 200 and 1 Perfect Circle No. 70— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width—1 Perfect Circle No. 85 and 1 Perfect Circle No. X90-85— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit at 160° F.  
Fit in Rod—Size to size.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Diam.—.3403".  
Seat Angle—45°.  
Seat Width—Not specified.  
Tappet Type—Cylindrical, with roller and lever.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—73 lbs. at  $\frac{3}{16}$ ".  
159 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster— $2\frac{1}{2}$ " +  $-\frac{1}{2}$ ".  
Camber—1° +  $-\frac{1}{4}$ ".  
Toe-in— $\frac{1}{16}$  +  $\frac{1}{16}$ -0".  
Kingpin Angle—1°-30".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Angle set, semi-floating, hypoid.  
Pinion Bearing Type—MRC 5308 and 5304.  
Adjustment—Shims.  
End Play—Not specified.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken No. 366 and No. 362.  
Adjustment—Thread.  
End Play—.015" spread.  
Lubricant Capacity—Housing—6 $\frac{1}{2}$  pts.

### TRANSMISSION

Make and Type—Own, silent, synchronized.  
Main Shaft Bearing Type and No.—MRC.  
211-6AG and 307-6AG.  
Countershaft Bearing Type and No.—Not specified.

### BRAKES

Type—Bendix two-shoe, hydraulic.  
Lining Type—Primary, Marshall No. 1035; secondary, No. 600.  
Lining Size—13" x  $2\frac{1}{2}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Notched wheel for clearance.  
Sliding type anchor.  
Clearance Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single dry plate.  
Facing Type—Raybestos No. 250.  
Pilot Bearing Type and No.—MRC. 205 SF.  
Throwout Bearing Type and No.—Ball.

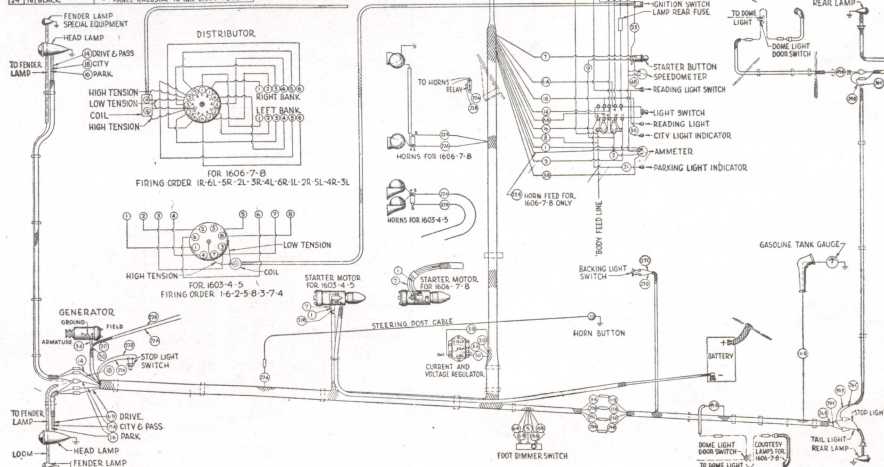
### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded and rubber bushed.

### STEERING GEAR

Type—Own, worm and double roller tooth.  
Adjustments  
Column end play—shims top cover.  
Cross-shaft end play—none.  
Mesh—Cross-shaft adjusting screw.  
Lubricant—Summer, S.A.E. No. 160.  
Winter, S.A.E. No. 90,  $\frac{3}{4}$  pt.

WIRE	COLOR	LOCATION	WIRE	COLOR	LOCATION
1	RED	FROM STARTER MOTOR SWITCH TO AMMETER	15	GREEN	FROM INSTRUMENT LIGHTS BROADCAST
2	BLACK	TO CURRENT REGULATOR TO GENERATOR	16	GREEN	TO INSTRUMENT LIGHTS BROADCAST
3	RED	TO LIGHT SWITCH TO LIGHT BULBS	17	GREEN	TO INSTRUMENT LIGHTS BROADCAST
4	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	18	GREEN	TO INSTRUMENT LIGHTS BROADCAST
5	RED	TO LIGHT SWITCH TO LIGHT BULBS	19	GREEN	TO INSTRUMENT LIGHTS BROADCAST
6	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	20	GREEN	TO INSTRUMENT LIGHTS BROADCAST
7	RED	TO LIGHT SWITCH TO LIGHT BULBS	21	GREEN	TO INSTRUMENT LIGHTS BROADCAST
8	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	22	GREEN	TO INSTRUMENT LIGHTS BROADCAST
9	RED	TO LIGHT SWITCH TO LIGHT BULBS	23	GREEN	TO INSTRUMENT LIGHTS BROADCAST
10	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	24	GREEN	TO INSTRUMENT LIGHTS BROADCAST
11	RED	TO LIGHT SWITCH TO LIGHT BULBS	25	GREEN	TO INSTRUMENT LIGHTS BROADCAST
12	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	26	GREEN	TO INSTRUMENT LIGHTS BROADCAST
13	RED	TO LIGHT SWITCH TO LIGHT BULBS	27	GREEN	TO INSTRUMENT LIGHTS BROADCAST
14	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	28	GREEN	TO INSTRUMENT LIGHTS BROADCAST
15	RED	TO LIGHT SWITCH TO LIGHT BULBS	29	GREEN	TO INSTRUMENT LIGHTS BROADCAST
16	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	30	GREEN	TO INSTRUMENT LIGHTS BROADCAST
17	RED	TO LIGHT SWITCH TO LIGHT BULBS	31	GREEN	TO INSTRUMENT LIGHTS BROADCAST
18	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	32	GREEN	TO INSTRUMENT LIGHTS BROADCAST
19	RED	TO LIGHT SWITCH TO LIGHT BULBS	33	GREEN	TO INSTRUMENT LIGHTS BROADCAST
20	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	34	GREEN	TO INSTRUMENT LIGHTS BROADCAST
21	RED	TO LIGHT SWITCH TO LIGHT BULBS	35	GREEN	TO INSTRUMENT LIGHTS BROADCAST
22	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	36	GREEN	TO INSTRUMENT LIGHTS BROADCAST
23	RED	TO LIGHT SWITCH TO LIGHT BULBS	37	GREEN	TO INSTRUMENT LIGHTS BROADCAST
24	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	38	GREEN	TO INSTRUMENT LIGHTS BROADCAST
25	RED	TO LIGHT SWITCH TO LIGHT BULBS	39	GREEN	TO INSTRUMENT LIGHTS BROADCAST
26	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	40	GREEN	TO INSTRUMENT LIGHTS BROADCAST
27	RED	TO LIGHT SWITCH TO LIGHT BULBS	41	GREEN	TO INSTRUMENT LIGHTS BROADCAST
28	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	42	GREEN	TO INSTRUMENT LIGHTS BROADCAST
29	RED	TO LIGHT SWITCH TO LIGHT BULBS	43	GREEN	TO INSTRUMENT LIGHTS BROADCAST
30	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	44	GREEN	TO INSTRUMENT LIGHTS BROADCAST
31	RED	TO LIGHT SWITCH TO LIGHT BULBS	45	GREEN	TO INSTRUMENT LIGHTS BROADCAST
32	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	46	GREEN	TO INSTRUMENT LIGHTS BROADCAST
33	RED	TO LIGHT SWITCH TO LIGHT BULBS	47	GREEN	TO INSTRUMENT LIGHTS BROADCAST
34	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	48	GREEN	TO INSTRUMENT LIGHTS BROADCAST
35	RED	TO LIGHT SWITCH TO LIGHT BULBS	49	GREEN	TO INSTRUMENT LIGHTS BROADCAST
36	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	50	GREEN	TO INSTRUMENT LIGHTS BROADCAST
37	RED	TO LIGHT SWITCH TO LIGHT BULBS	51	GREEN	TO INSTRUMENT LIGHTS BROADCAST
38	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	52	GREEN	TO INSTRUMENT LIGHTS BROADCAST
39	RED	TO LIGHT SWITCH TO LIGHT BULBS	53	GREEN	TO INSTRUMENT LIGHTS BROADCAST
40	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	54	GREEN	TO INSTRUMENT LIGHTS BROADCAST
41	RED	TO LIGHT SWITCH TO LIGHT BULBS	55	GREEN	TO INSTRUMENT LIGHTS BROADCAST
42	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	56	GREEN	TO INSTRUMENT LIGHTS BROADCAST
43	RED	TO LIGHT SWITCH TO LIGHT BULBS	57	GREEN	TO INSTRUMENT LIGHTS BROADCAST
44	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	58	GREEN	TO INSTRUMENT LIGHTS BROADCAST
45	RED	TO LIGHT SWITCH TO LIGHT BULBS	59	GREEN	TO INSTRUMENT LIGHTS BROADCAST
46	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	60	GREEN	TO INSTRUMENT LIGHTS BROADCAST
47	RED	TO LIGHT SWITCH TO LIGHT BULBS	61	GREEN	TO INSTRUMENT LIGHTS BROADCAST
48	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	62	GREEN	TO INSTRUMENT LIGHTS BROADCAST
49	RED	TO LIGHT SWITCH TO LIGHT BULBS	63	GREEN	TO INSTRUMENT LIGHTS BROADCAST
50	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	64	GREEN	TO INSTRUMENT LIGHTS BROADCAST
51	RED	TO LIGHT SWITCH TO LIGHT BULBS	65	GREEN	TO INSTRUMENT LIGHTS BROADCAST
52	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	66	GREEN	TO INSTRUMENT LIGHTS BROADCAST
53	RED	TO LIGHT SWITCH TO LIGHT BULBS	67	GREEN	TO INSTRUMENT LIGHTS BROADCAST
54	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	68	GREEN	TO INSTRUMENT LIGHTS BROADCAST
55	RED	TO LIGHT SWITCH TO LIGHT BULBS	69	GREEN	TO INSTRUMENT LIGHTS BROADCAST
56	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	70	GREEN	TO INSTRUMENT LIGHTS BROADCAST
57	RED	TO LIGHT SWITCH TO LIGHT BULBS	71	GREEN	TO INSTRUMENT LIGHTS BROADCAST
58	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	72	GREEN	TO INSTRUMENT LIGHTS BROADCAST
59	RED	TO LIGHT SWITCH TO LIGHT BULBS	73	GREEN	TO INSTRUMENT LIGHTS BROADCAST
60	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	74	GREEN	TO INSTRUMENT LIGHTS BROADCAST
61	RED	TO LIGHT SWITCH TO LIGHT BULBS	75	GREEN	TO INSTRUMENT LIGHTS BROADCAST
62	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	76	GREEN	TO INSTRUMENT LIGHTS BROADCAST
63	RED	TO LIGHT SWITCH TO LIGHT BULBS	77	GREEN	TO INSTRUMENT LIGHTS BROADCAST
64	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	78	GREEN	TO INSTRUMENT LIGHTS BROADCAST
65	RED	TO LIGHT SWITCH TO LIGHT BULBS	79	GREEN	TO INSTRUMENT LIGHTS BROADCAST
66	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	80	GREEN	TO INSTRUMENT LIGHTS BROADCAST
67	RED	TO LIGHT SWITCH TO LIGHT BULBS	81	GREEN	TO INSTRUMENT LIGHTS BROADCAST
68	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	82	GREEN	TO INSTRUMENT LIGHTS BROADCAST
69	RED	TO LIGHT SWITCH TO LIGHT BULBS	83	GREEN	TO INSTRUMENT LIGHTS BROADCAST
70	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	84	GREEN	TO INSTRUMENT LIGHTS BROADCAST
71	RED	TO LIGHT SWITCH TO LIGHT BULBS	85	GREEN	TO INSTRUMENT LIGHTS BROADCAST
72	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	86	GREEN	TO INSTRUMENT LIGHTS BROADCAST
73	RED	TO LIGHT SWITCH TO LIGHT BULBS	87	GREEN	TO INSTRUMENT LIGHTS BROADCAST
74	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	88	GREEN	TO INSTRUMENT LIGHTS BROADCAST
75	RED	TO LIGHT SWITCH TO LIGHT BULBS	89	GREEN	TO INSTRUMENT LIGHTS BROADCAST
76	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	90	GREEN	TO INSTRUMENT LIGHTS BROADCAST
77	RED	TO LIGHT SWITCH TO LIGHT BULBS	91	GREEN	TO INSTRUMENT LIGHTS BROADCAST
78	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	92	GREEN	TO INSTRUMENT LIGHTS BROADCAST
79	RED	TO LIGHT SWITCH TO LIGHT BULBS	93	GREEN	TO INSTRUMENT LIGHTS BROADCAST
80	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	94	GREEN	TO INSTRUMENT LIGHTS BROADCAST
81	RED	TO LIGHT SWITCH TO LIGHT BULBS	95	GREEN	TO INSTRUMENT LIGHTS BROADCAST
82	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	96	GREEN	TO INSTRUMENT LIGHTS BROADCAST
83	RED	TO LIGHT SWITCH TO LIGHT BULBS	97	GREEN	TO INSTRUMENT LIGHTS BROADCAST
84	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	98	GREEN	TO INSTRUMENT LIGHTS BROADCAST
85	RED	TO LIGHT SWITCH TO LIGHT BULBS	99	GREEN	TO INSTRUMENT LIGHTS BROADCAST
86	BLACK	TO LIGHT SWITCH TO LIGHT BULBS	100	GREEN	TO INSTRUMENT LIGHTS BROADCAST



## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAX 4014.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No Load—With drive, 65 amps., 5.5 volts, 5300 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—42-53 oz., with new brushes.

### GENERATOR

Make—Auto-Lite—GCO-4803A.  
Drive—Belt.  
Regulation—Auto-Lite voltage regulator VRB-4002-D.  
Thermostat—None.  
Output, cold—28 amps., 8 volts.  
Output, hot—28 amps., 8 volts.  
Brush Spring Tension—27-53 oz., with new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7 volts.  
Amps. Discharge to Open—None.  
Field Fuse—None.

### IGNITION

Distributor—Auto-Lite—IGT-4006.  
Coil—Auto-Lite—CE 4026.  
Distr. Rotation—Clockwise, viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.0255"-.0305".  
Spark Plug Size—10 m/m No. 103 A. C., or No. Y4 Champion.  
Manual Advance—None.  
Automatic Advance—Full automatic.  
Timing—6° before top dead center.  
Coil Amps., Engine Idling—0.5 amps.  
Coil Amps., Engine Stopped—2.5 amps.

### BATTERY

Amps.—150 amp. hour.

### LAMPS

Head—2330L (right), 1104 (left lamp).  
Park—No. 55.  
Instrument—No. 55.  
Fuse—25 volt, 20 amp.  
Dome—Not given.  
Stop and Tail—No. 87 and No. 63.

Packard 12, '38  
Series 1607,  
1608



# Packard 8, 1938

SERIES 1601, 1602

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ ".  
Stroke— $4\frac{1}{4}$ ".  
Taxable H. P.—33.8.  
Displacement—282.05 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max H. P.—120 at 3800 r.p.m.

### CAMSHAFT

Drive—Morse No. 1866 RX.  
Chain Data—58 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—5, steel-backed babbitt.  
End Thrust Taken On—Thrust plate, front end.  
End play, .002"-.004".  
Bearing Clearance—.001"-.003".

### CONNECTING RODS

End Clearance—.004"-.010".  
Dia. Clearance—.0005"-.0015".

### COOLING SYSTEM

Capacity—4 gals.  
Pump Drive—Fan belt.  
Belt Size—42" V— $49\frac{1}{4}$ " O.D. x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Babbitt-lined, steel shell.  
End Thrust Taken On—Center bearing.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Duplex, downdraft.  
Adjustment—Turn in to lean, or out to enrich mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—35 lbs. normal driving speed.  
Adjustment—Non-adjustable.  
Oil { Below —10° F. .... S.A.E. 10W.  
      —10° F. .... S.A.E. 10W.  
      plus 10% kerosene.  
      +10° F. .... S.A.E. 20W.  
      +32° F. .... S.A.E. 30  
      Average 90° F. .... S.A.E. 40

### PISTONS

Material—Autothermic alum., with strut.  
Clearance—Top—Not specified.  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—All rings .007"-.015".  
No. Comp. Rings—2 Perfect Circle No. 70.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1 Perfect Circle X90-85.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit 160° F.  
Fit in Rod—Size to size.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.—.34025".  
Seat Angle—Int., 30°; Exh., 45°.  
Seat Width—Not given.  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.007".  
Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure—50 lbs. at  $1\frac{1}{8}$ ".  
120 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ " + — $\frac{1}{2}$ ".  
Camber— $\frac{1}{2}$ " + — $\frac{1}{2}$ ".  
Toe-in—0 +  $\frac{1}{16}$ "-0.  
Kingpin Angle—1°-54'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Timken 3879-3820A and 3776A-3735.  
Adjustment—Thread.  
End Play—5 to 6 lbs pull, 5" wrench.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken 2984-2924.  
Adjustment—Thread.  
End Play—.010" spread.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Own, synchronized.  
Main Shaft Bearing Type and No.—MRC 209 CFG and 306 SG.  
Countershaft Bearing Type and No.—Not specified.

### BRAKES

Type—Bendix, two-shoe hydraulic.  
Lining Type—Primary, No. 451 Raybestos; secondary, No. 589F, U. S.  
Lining Size—1601,  $1\frac{3}{4}$ " x  $\frac{3}{16}$ " x 13".  
1601A and 1602,  $2\frac{1}{4}$ " x  $\frac{3}{16}$ " x 13".  
Adjustments—Eccentric for centralizing.  
Notched wheel for clearance.  
Sliding type anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single dry plate.  
Facing Type—U. S. No. 733, woven.  
Pilot Bearing Type and No.—MRC No. 7109.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Rubber bushed.

### STEERING GEAR

Type—Own, worm and double-tooth roller.  
Adjustments—Column end play—shims top cover.  
Cross-shaft end play—adjusting screw.  
Mesh—shims on cross-shaft.  
Lubricant—Summer, S.A.E. 160; Winter, S.A.E. No. 90—11 oz.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—MAX—4006.  
Drive—Bendix.  
Rotation—Clockwise, viewing drive end.  
No. Load—With drive, 65 amps, 5.5 volts, 5300 r.p.m. min.  
Lock Torque—16 ft. lbs., 600 amps, 2.7 volts.  
Brush Spring Tension—31-42 oz., with new brushes.

### GENERATOR

Make—Auto-Lite—GCJ—4807-A-2.  
Drive—Belt.  
Regulation—Auto-Lite voltage regulator VRD—4001-A.  
Thermostat—None.  
Output, cold—30½ amps, 8 volts.  
Output, hot—25½ amps, 8 volts.  
Brush Spring Tension—27-53 oz., with new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 to 7.25 volts.  
Amps. Discharge to Open—None.  
Field Fuse—None.

### IGNITION

Distributor—Auto-Lite—IGT—4007.  
Coil—Auto-Lite—CE 4628.  
Distr. Rotation—Counter-clockwise, viewed from top.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.0255"-.0305".  
Spark Plug Size—10 m/m No. 103 A. C., or No. Y4 Champion.  
Manual Advance—None.  
Automatic Advance—Full automatic.  
Timing—8° before top dead center.  
2½°-4° before top dead center, high compression head.  
Coil Amps., Engine Idling—0.5 amp.  
Coil Amps., Engine Stopped—2.5 amp.

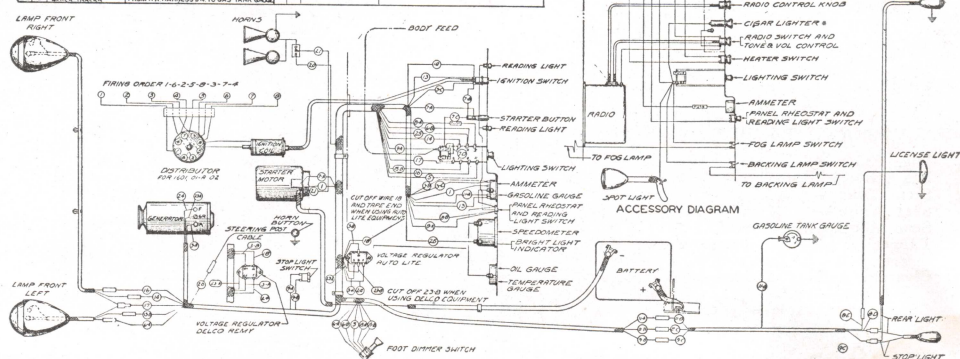
### BATTERY

Amps.—114 amp. hr.

### LAMPS

Head—2330L (right), 1104 (left lamp).  
Park—No. 55.  
Instrument—No. 55.  
Fuse—25 volt, 20 amp.  
Dome—No. 81.  
Stop and Tail—No. 1158.

NO.	COLOR	LOCATION	NO.	COLOR	LOCATION
1	RED	FROM STARTER MOTOR SWITCH TO AMMETER	13	BLACK	FROM SWITCH SWITCH TO GASOLINE GAUGE
2	RED	FROM CURRENT REGULATOR TO GENERATOR	14	RED	FROM LIGHTING SW TO LAMP FRONT PT. (CUT)
3	BLACK	FROM CURRENT REGULATOR TO AMMETER	15	WHITE	FROM DIMMER SW TO LAMP FRONT PT. (CUT)
4	BLACK	FROM SWITCH SWITCH TO AMMETER	16	WHITE	FROM DIMMER SWITCH TO LIGHTING SWITCH
5	BLACK	FROM LIGHTING SWITCH TO DIMMER SWITCH	17	GREEN	FROM LIGHTING SW TO LAMP FRONT PT. (CUT)
6	YELLOW	FROM DIMMER SWITCH TO LAMP PT. (CUT)	18	BLACK WITH RED TRACE	FROM LIGHTING SW TO LAMP FRONT PT. (CUT)
7	YELLOW	FROM DIMMER SWITCH TO LIGHTING SWITCH	19	YELLOW	FROM SWITCH SW TO CURRENT REGULATOR
8	BLACK	FROM STARTER BUTT. TO STARTER MOTOR	20	BLACK	FROM STEERING POST TO HORN RELAY
9	BLACK	FROM STARTER BUTT. TO LIGHTING SWITCH	21	BLACK	FROM STARTER MOTOR SW TO HORN RELAY
10	BLACK	FROM STARTER BUTT. TO LIGHTING SWITCH	22	GREEN	FROM VOL. TAG. REGULATOR TO GENERATOR
11	BLACK	FROM PANEL METER TO FUSE TO LIGHT SW	23	BROWN	FROM VOLTAGE REGULATOR TO GENERATOR
12	BLACK	FROM PANEL METER TO FUSE TO LIGHT SW	24	WHITE	FROM LIGHTING SW TO SPEEDOMETER LIGHT
13	BLACK	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
14	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
15	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
16	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
17	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
18	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
19	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
20	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
21	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
22	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
23	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			
24	GREEN	FROM FUSE AT LIGHTS SW TO STOP LIGHT SW			





# Packard 12, 1938

SERIES 1607, 1608

## ENGINE

### DATA

No. of Cylinders—12 (two blocks at 67° angle).  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable H. P.—56.7.  
Displacement—473.0 cu. in.  
Firing Order—1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L.  
Max H. P.—175 at 3200 r.p.m.

### CAMSHAFT

Drive—Morse No. 1866N, chain.  
Chain Data—56 links,  $1\frac{3}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, steel-backed babbit.  
End Thrust Taken On—Front end.  
End play—.002"-.006".  
Bearing Clearance—Nos. 1 and 4, .001"-.0015".  
Nos. 2 and 3, .002"-.0025".

### CONNECTING RODS

End Clearance—.008"-.010".  
Dia. Clearance—.001"-.0015".

### COOLING SYSTEM

Capacity—10 gals.  
Pump Drive—Fan belt.  
Belt Size—Dual 47°V,  $50\frac{1}{2}$ " O.D. x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt lined, steel shell.  
End Thrust Taken On—Front bearing.  
End Clearance—.003"-.005".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Duplex downdraft.  
Adjustment—Turn in to lean; out to enrich mixture.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—10 qts.  
Oil Pressure—50 lbs. normal driving speed.  
Adjustment—Thread.  
Oil {  
Below -10° F. .... S.A.E. 10W.  
plus 10% kerosene.  
-10° F. .... S.A.E. 10W.  
+10° F. .... S.A.E. 20W.  
+32° F. .... S.A.E. 30W.  
Average 90° F. .... S.A.E. 40

### PISTONS

Material—Autothermic alum., with strut.  
Clearance—Top—Not specified.  
Clearance—Bottom—.0015".

### PISTON RINGS

Gap—All rings .007"-.015.  
No. Comp. Rings—3.  
Width—1 Perfect Circle No. 200; 2 Perfect Circle No. 70,  $\frac{1}{8}$ " wide.  
No. Oil Rings—1.  
Width—Perfect Circle No. X90-85—.155" wide.

### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit at 160° F.  
Fit in Rod—Size to size.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—Int., .3405"; Exh., .338".  
Seat Angle—45°.  
Seat Width—Not specified.  
Tappet Type—Roller and lever.  
Clearance—Hot: Intake—Automatic take-up.  
Exhaust—Automatic take-up.  
Guides Removable—Yes.  
Spring Pressure—70 lbs. at  $2\frac{7}{32}$ ".  
145 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster—0° + 0° -  $\frac{1}{2}$ ".  
Camber—1° +  $-\frac{1}{4}$ ".  
Toe-in— $\frac{1}{16}$ " +  $\frac{1}{16}$ " - 0".  
Kingpin Angle—1° 30".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Angle set semi-floating, hypoid.  
Pinion Bearing Type—MRC 5309 and 5304.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken 469-452.  
Adjustment—Thread.  
End Play—.015" spread.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Own, silent, synchronized.  
Main Shaft Bearing Type and No.—MRC.  
211-6AG and 307-6AG.  
Countershaft Bearing Type and No.—Not given.

### BRAKES

Type—Bendix two-shoe, hydraulic.  
Lining Type—Primary, 451 Raybestos; secondary, No. 589U.S.  
Lining Size—15" x  $2\frac{3}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments—Eccentric for centralizing.  
Notch wheel for clearance.  
Sliding type anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate with vacuum booster.  
Facing Type—Hycos DB 3903 PDX.  
Pilot Bearing Type and No.—MRC 205SF.  
Throwout Bearing Type and No.—Ball.

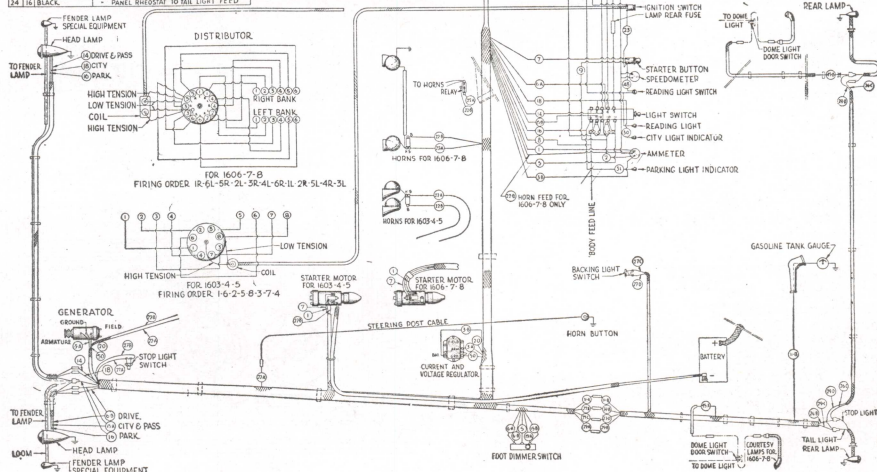
### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded and rubber bushing.

### STEERING GEAR

Type—Own, worm and double-tooth roller.  
Adjustments—Column end play—shims top cover.  
Cross-shaft end play—none.  
Mesh—Cross-shaft adjusting screw.  
Lubricant—Summer, S.A.E. 160; Winter, S.A.E. 90 ( $\frac{3}{4}$  pint).

NO.	COLOR	LOCATION	NO.	COLOR	LOCATION
1	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	25	GREEN	FROM HORN RELAY TO HORN SWITCH
2	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	26	GREEN	FROM HORN RELAY TO HORN SWITCH
3	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	27	GREEN	FROM HORN RELAY TO HORN SWITCH
4	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	28	GREEN	FROM HORN RELAY TO HORN SWITCH
5	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	29	GREEN	FROM HORN RELAY TO HORN SWITCH
6	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	30	GREEN	FROM HORN RELAY TO HORN SWITCH
7	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	31	GREEN	FROM HORN RELAY TO HORN SWITCH
8	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	32	GREEN	FROM HORN RELAY TO HORN SWITCH
9	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	33	GREEN	FROM HORN RELAY TO HORN SWITCH
10	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	34	GREEN	FROM HORN RELAY TO HORN SWITCH
11	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	35	GREEN	FROM HORN RELAY TO HORN SWITCH
12	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	36	GREEN	FROM HORN RELAY TO HORN SWITCH
13	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	37	GREEN	FROM HORN RELAY TO HORN SWITCH
14	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	38	GREEN	FROM HORN RELAY TO HORN SWITCH
15	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	39	GREEN	FROM HORN RELAY TO HORN SWITCH
16	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	40	GREEN	FROM HORN RELAY TO HORN SWITCH
17	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	41	GREEN	FROM HORN RELAY TO HORN SWITCH
18	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	42	GREEN	FROM HORN RELAY TO HORN SWITCH
19	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	43	GREEN	FROM HORN RELAY TO HORN SWITCH
20	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	44	GREEN	FROM HORN RELAY TO HORN SWITCH
21	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	45	GREEN	FROM HORN RELAY TO HORN SWITCH
22	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	46	GREEN	FROM HORN RELAY TO HORN SWITCH
23	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	47	GREEN	FROM HORN RELAY TO HORN SWITCH
24	BLACK	FROM SINGLE MOTOR SWITCH TO AMPMETER	48	GREEN	FROM HORN RELAY TO HORN SWITCH



## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite—DN 1389.  
Drive—Bendix.  
Rotation—Clockwise, viewing pinion.  
No Load—With drive, 50 amps., 6.0 volts, 3000 r.p.m.  
Lock Torque—39 ft. lbs., 610 amps., 2.9 volts.  
Brush Spring Tension—56-60 oz., with new brushes.

### GENERATOR

Make—Auto-Lite—GCE 4803-A.  
Drive—Belt.  
Regulation—Auto-Lite voltage regulator No. VRB-4008AP.  
Thermostat—None.  
Output, cold—30 amps. at 8 volts.  
Output, hot—30 amps. at 8 volts.  
Brush Spring Tension—64-68 oz., with new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—6.5 to 7 volts.  
Amps. Discharge to Open—0.  
Field Fuse—None.

### IGNITION

Distributor—Auto-Lite—IGO-4002-A.  
Coil—Auto-Lite—CE-1203.  
Distr. Rotation—Counter-clockwise, from above.  
Breaker Gap—.018"-.022".  
Brush Spring Tension—15-19 oz.  
Spark Plug Gap—.0255"-.0305".  
Spark Plug Size—10 m/m No. 103 A. C., or No. Y4 Champion.  
Manual Advance—None.  
Automatic Advance—Full automatic.  
Timing—6° before top dead center.  
4°-6° before top dead center for high compression head.  
Coil Amps., Engine Idling—0.5 amps.  
Coil Amps., Engine Stopped—2.5 amps.

### BATTERY

Amps.—150 amp. hrs.

### LAMPS

Head—2330-L (right), 1104 (left lamp).  
Park—No. 55.  
Instrument—No. 55.  
Fuse—Thermostat relay, tail and stop light fuse 25 volts, 20 amps.  
Dome—Not given.  
Stop and Tail—No. 87 and No. 63.

Packard 12, '38  
Series 1607,  
1608



# Packard 6, 1937

MODEL 115-C

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{7}{16}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable HP.—28.36.  
Displacement—237.0 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. HP.—100 @ 3600 r.p.m.

### CAMSHAFT

Drive—Morse 1866 RX chain.  
Chain Data—58 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, replaceable.  
End Thrust Taken On—Thrust plate front end. End clearance .002"-.004".  
Bearing Clearance—.001"-.003".

### CONNECTING RODS

End Clearance—.004"-.010".  
Dia. Clearance—.0015".

### COOLING SYSTEM

Capacity— $4\frac{1}{4}$  gal.  
Pump Drive—Fan belt.  
Belt Size—42° V,  $43 \times \frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt lined steel shell.  
End Thrust Taken On—Front Bearing.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Chandler and Groves "AOC-2".  
Type—Downdraft single.  
Adjustment—Idle adjustment only  $\frac{7}{8}$  turn open.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—35 lbs. at normal driving (30 m.p.h.).  
Adjustment—Non-adjustable.

Oil { 90° F and over, S. A. E. 40.  
40° F and over, S. A. E. 30.  
25° F to 85° F, S. A. E. 20 or 20-W.  
10° F to 85° F, S. A. E. 20-W.  
10° F to 45° F, S. A. E. 10-W.  
Below 10° F, S. A. E. 10-W.  
+ 10% Kerosene.

### PISTONS

Material—Alum. Alloy with strut.  
Clearance—Bottom—.0015" 12-18 lbs. pull.

### PISTON RINGS

Gap—Comp. .007"-.012"; Oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit at 160° F.  
Fit in Rod—Min. .00025" push fit room temperature.

### VALVES AND TAPPETS

Dia. Exhaust—1.406".  
Dia. Intake—1.575".  
Stem Dia.—.340".  
Seat Angle—Int. 30°, Exh. 45°.  
Seat Width—Not given.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.007".  
Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure—40 lbs. @  $1\frac{1}{2}$ ".  
110 lbs valve open.

## CHASSIS

### FRONT AXLE

Caster— $2\frac{1}{4}$ ° + or —  $\frac{1}{2}$ °.  
Camber—1° + or —  $\frac{1}{4}$ °.  
Toe-in— $\frac{1}{32}$ "- $\frac{1}{8}$ ".  
Kingspin Angle—1°-30'.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—25 to 30 inch pounds pre-load drag.  
Lash—.003"-.005".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.010" spread.  
Lubricant Capacity—Housing—5 pts.

### TRANSMISSION

Make and Type—3 speed helical, Synchromesh.  
Main Shaft Bearing Type and No.—MRC-209CFG and 306SG.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Hydraulic (Bendix).  
Lining Type—Not specified.  
Lining size— $13 \times 1\frac{1}{4} \times \frac{3}{16}$ " per shoe.  
Adjustments—Eccentric for centralizing; Adjusting screw for clearance; Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—MRC-7109.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and double tooth roller.  
Adjustments—Column end play—shims under worm cover; Cross shaft end play; adjusting screw; Mesh shims on cross shaft.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 739F.  
Drive—Bendix drive.  
Rotation—Clockwise viewing pinion.  
No Load—65 amps, 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.6 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy 948U.  
Drive—Belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold—22 amps. at 8 volts at 3000 r.p.m.  
Output, hot—18 amps. at 8 volts at 3500 r.p.m.  
Brush Spr. Tension—Main 22-26 oz.; Third brush 16-20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to close— $6\frac{1}{2}$  to 7 volts.  
Amps. Discharge to Open—3 max.  
Field Fuse—None.

### IGNITION

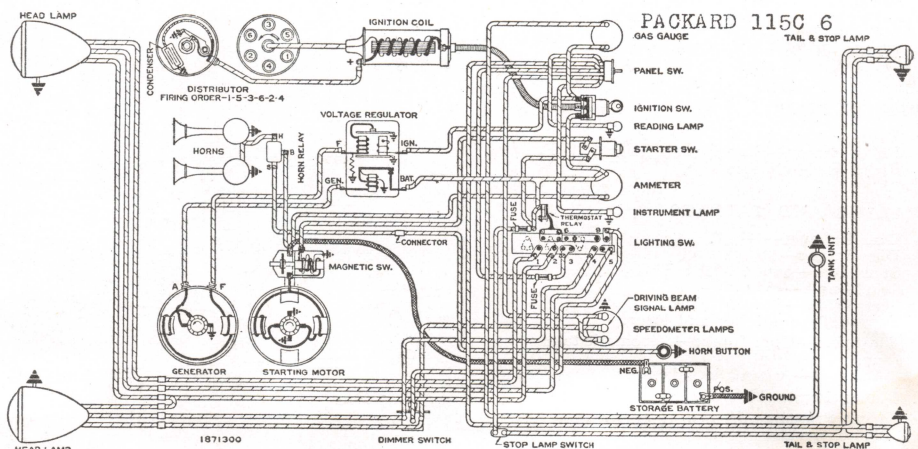
Distributor—Delco-Remy 647E.  
Coil—Delco-Remy 539N.  
Distr. Rotation—Clockwise viewing drive end.  
Breaker Gap—.0125"-.0175".  
Brush Spr. Tension—19-23 oz.  
Sp. Plug Gap—A. C. or Champion 10 m/m "Y4".  
Sp. Plug Size—.028"-.030".  
Manual Advance—20° engine.  
Automatic Adv.—21 $\frac{1}{2}$ ° at 4000 engine rpm; Vacuum adv., 15° engine.  
Timing—2 $\frac{1}{2}$ ° to 4° before top center.  
Alum. head—4° to 6° before top center.  
Coil Amps., Engine Idling— $\frac{1}{2}$  amp.  
Coil Amps., Engine Stopped—2 $\frac{1}{2}$  amps.

### BATTERY

Amps.—Willard 94 amp. hr.

### LAMPS

Head—2330L.  
Park—55.  
Instrument—55.  
Fuse—25 volt—20 amp.  
Stop and Tail—"B" 63 and 87.





# Packard 8, 1937

SERIES 1500-1-2

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{3}{16}$ ".  
Stroke—5".  
Taxable HP.—32.5.  
Displacement—320 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. HP.—135 at 3200 r.p.m.

### CAMSHAFT

Drive—Morse No. 3682-kx chain.  
Chain Data—70 links,  $1\frac{1}{2}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—8.  
End Thrust Taken On—Front end.  
End clearance—.001"-.004".  
Bearing Clearance—.0015"-.0035".

### CONNECTING RODS

End Clearance—.005"-.008".  
Dia. Clearance—.001"-.002".

### COOLING SYSTEM

Capacity—6 gal.  
Pump Drive—Fan belt.  
Belt Size—42"V,  $47\frac{3}{4}$ "x1".  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj.—Thread.

### CRANKSHAFT

No. Bearings—9.  
Material—Babbitt lined steel shell.  
End Thrust Taken On—No. 7 bearing.  
End Clearance—.003"-.005".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-23".  
Type—Downdraft Duplex.  
Adjustment—Idle adjustment only—Turn in to lean and out to enrich mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—8 qts.  
Oil Pressure—35 lbs. at normal driving speed.  
Adjustment—Thread.  
Oil { 90°F and over, S. A. E. No. 40.  
40°F and over, S. A. E. No. 30.  
25°F to 85°F, No. 20 or 20-W.  
10°F to 85°F, S. A. E. No. 20-W.  
10°F to 45°F, No. 10-W.  
Below 10°F, S. A. E. No. 10-W  
+10% Kerosene.

### PISTONS

Material—Alum. alloy with strut.  
Clearance—Bottom—.0015" 3 to 5 lbs. pull.

### PISTON RINGS

Gap—Comp. .007"-.012"; Oil .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit at 160°F.  
Fit in Rod—Finger push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—.3405".  
Seat Angle—45".  
Seat Width—Not specified.  
Tappet Type—Lever and roller.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—73 lbs. at  $3\frac{1}{16}$ ";  
159 valve open.

## CHASSIS

### FRONT AXLE

Caster— $2\frac{1}{2}$ " + or -  $\frac{1}{2}$ ".  
Camber—1° + or -  $\frac{1}{4}$ ".  
Toe-In— $\frac{1}{32}$ " to  $\frac{1}{8}$ ".  
Kingpin Angle—1°-30".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—MRC 5308 and 5304.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken.  
Adjustment—Thread.  
End Play—.015" spread.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—3 speed helical, synchro-mesh.  
Main Shaft Bearing Type and No.—MRC 211-6AG and 307-6AG.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Hydraulic (Bendix).  
Lining Type—Not specified.  
Lining Size—13"x $2\frac{1}{2}$ "x $\frac{3}{16}$ " per shoe.  
Adjustments—Eccentric for centralizing;  
Adjusting screw for clearance;  
Adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

### CLUTCH

Type—Dry plate.  
Facing Type—Not specified.  
Pilot Bearing Type and No.—MRC 205SF.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded.

### STEERING GEAR

Type—Worm and double roller.  
Adjustments—Column end play—shims under worm cover. Cross-shaft end play—adjusting screw. Mesh—Cross shaft adjusting screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 729-H.  
Drive—Bendix.  
Rotation—Clockwise viewing pinion.  
No Load—60 amps., 5 volts, 6000 r.p.m.  
Lock Torque—16 ft. lbs., 600 amp., 3 volt.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy 961-J.  
Drive—Belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold—25 amps. at 8 volts at 1650 r.p.m.  
Output, hot—25 amps. at 8 volts.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to close— $6\frac{1}{2}$  to 7 volts.  
Amps. Discharge to Open—3 max.  
Field Fuse—None.

### IGNITION

Distributor—Delco-Remy 663-L.  
Coil—Delco-Remy 539K.  
Distr. Rotation—Clockwise viewing drive end  
Breaker Gap—.0125"-.0175".  
Brush Spr. Tension—19-23 oz.  
Sp. Plug Gap—.028"-.030".  
Sp. Plug Size—A. C. or Champion 10 m/m Y-4.  
Manual Advance—24° engine.  
Automatic Adv.—19½° engine at 4000 engine r.p.m. Vacuum adv. 13° max.  
Timing—6° to 8° before top center.  
High compression head 4° to 5½° before top center.

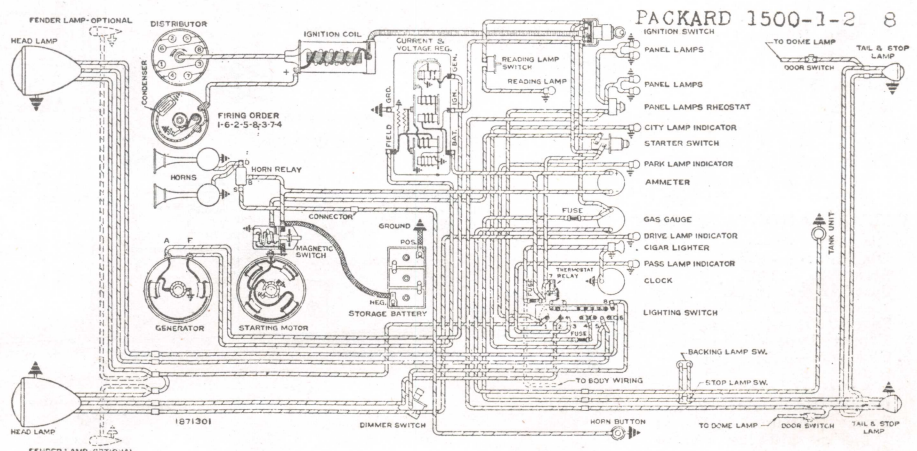
Coil Amps., Engine Idling—½ amp.  
Coil Amps., Engine Stopped—2½ amp.

### BATTERY

Amps.—150 amp. hr.

### LAMPS

Head—2330-L (R) 1104 (L).  
Park—55.  
Instrument—"B" 63.  
Fuse—25 volt, 20 amp.  
Stop and Tail—"B" 63 and 87.





# Packard, 1937

## MODEL 120-C

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable H. P.—33.8  
Displacement—282.04 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—120 at 3800 r.p.m.

#### CAMSHAFT

Drive—Morse No. 1866 RX chain.  
Chain Data—58 links,  $1\frac{1}{4}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—5, steel backed babbitt.  
End Thrust Taken On—Thrust plate front end. End clearance—.002"-.004".  
Bearing Clearance—.001"-.003".

#### CONNECTING RODS

End Clearance—.004"-.010".  
Dia. Clearance—.0015".

#### COOLING SYSTEM

Capacity—5 gal.  
Pump Drive—Fan belt.  
Belt Size— $42 \times V-43 \times \frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Thread.

#### CRANKSHAFT

No. Bearings—5.  
Material—Babbitt lined steel shell.  
End Thrust Taken On—Center bearing.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

#### FUEL SYSTEM

Carburetor Make—Stromberg "EE14."  
Type—Downdraft.  
Adjustment—Idle only—Turn in to lean; out to richen mixture.  
Carter "WDO." Downdraft dual. Idle adjustment,  $\frac{1}{2}$  to  $\frac{1}{4}$  turns open.  
Fuel Delivery—Camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—35 lbs. at normal driving (30 m. p. h.).  
Adjustment—Non-adjustable.  
Oil { 90° F and over.....S.A.E. No. 40.  
40° F and over.....S.A.E. No. 30.  
25°-85° F.....S.A.E. No. 20 or 20W.  
10°-85° F.....No. 20 W.  
10°-45° F.....S.A.E. No. 10 W.  
-10° F.....S.A.E. No. 10 W and 10% kerosene.

#### PISTONS

Material—Alum alloy with strut.  
Clearance—Bottom—.0015", 8 to 11 lbs. pull.

#### PISTON RINGS

Gap—Comp., .007"-.012"; oil, .007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Finger push fit at 160° F.  
Fit in Rod—Min., .00025"; push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{7}{32}$ ".  
Stem Dia.—.340".  
Seat Angle—Intake, 30°; exhaust, 45°.  
Seat Width—Not specified.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.007".  
Exhaust—.010".  
Guides Removable—Yes.  
Spring Pressure—40 lbs. at  $1\frac{1}{8}$ "; 110 lbs. valve open.

### CHASSIS

#### FRONT AXLE

Caster— $2\frac{1}{2}$ " plus or minus  $\frac{1}{2}$ ".  
Camber—1° plus or minus  $\frac{1}{4}$ ".  
Toe-in— $\frac{1}{16}$ " plus or minus  $\frac{1}{16}$ ".  
Kingpin Angle—1°-30'.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating, hypoid.  
Pinion Bearing Type—Timken.  
Adjustment—Shim.  
End Play—20 to 30 inch pounds pre-load drag.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken.  
Adjustment—Thread.  
End Play—.010" spread.  
Lubricant Capacity—Housing—5 pts.

#### TRANSMISSION

Make and Type—3 speed helical, synchro mesh.  
Main Shaft Bearing Type and No.—MRC 209 CFG and 306 SG.  
Countershaft Bearing Type and No.—Roller

#### BRAKES

Type—Hydraulic (Bendix).  
Lining Type—Not specified.  
Lining Size—13" x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ " per shoe.  
Adjustments—Eccentric for centralizing; adjusting screw for clearance; adjustable anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—50-50.

#### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—MRC 7109.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

#### STEERING GEAR

Type—Worm and double tooth roller.

#### Adjustments

Column end play—shims under worm cover.  
Cross-shaft end play—adjusting screw.  
Mesh—Shims on cross-shaft.

Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite, MAX 4006.  
Drive—Bendix.  
Rotation—Counter-clockwise, viewing drive end.  
No Load—65 amps., 5.5 volts, 5300 r. p. m.  
Lock Torque—16 ft. lbs., 640 amps., 3 volts.  
Brush Spring Tension—31-42 oz.

#### GENERATOR

Make—Auto-Lite, GCJ 4801 A.  
Drive—Belt.  
Regulation—Voltage regulation.  
Thermostat—None.  
Output, cold—25 amps. at 8 volts, 2500 r.p.m.  
Output, hot—20 amps. at 8 volts, 2500 r.p.m.  
Brush Spring Tension—24-36 oz.  
Rotation—Counter-clockwise, viewed from drive end.  
Cutout to close— $6\frac{3}{4}$  to  $7\frac{1}{4}$  volts.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

#### IGNITION

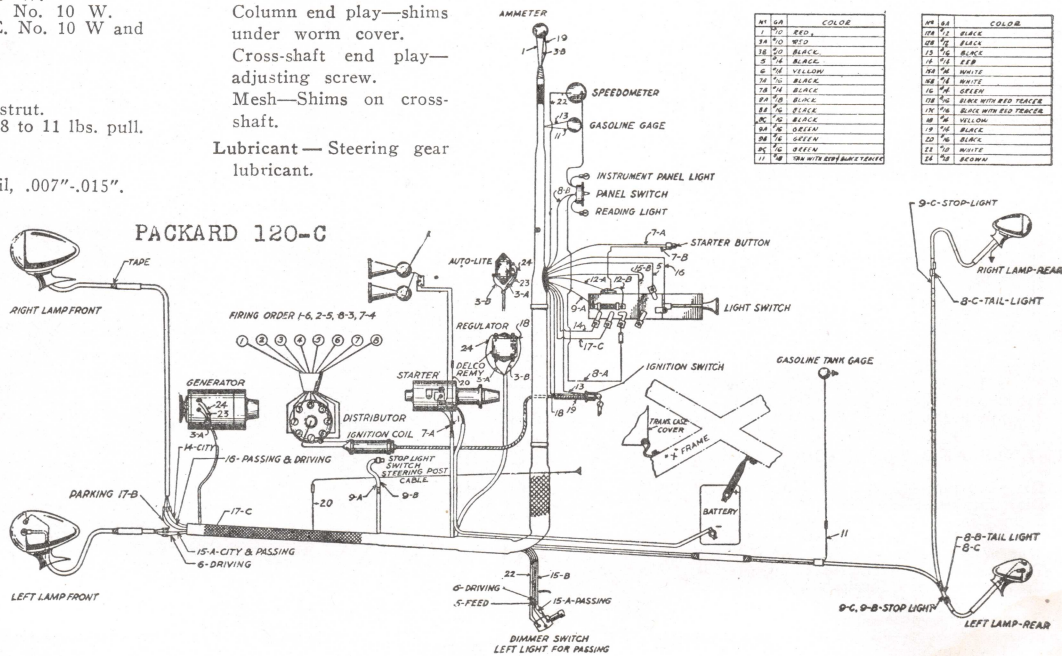
Distributor—Auto-Lite, IGT 4004.  
Coil—Auto-Lite, CE 4623.  
Distr. Rotation—Counter-clockwise, viewed from top.  
Breaker Gap—.0125"-.0175".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.028"-.030".  
Spark Plug Size—A.C. or Champion, 10m/m. Y4.  
Manual Advance—None.  
Automatic Advance—20°.  
Vacuum Advance—15°.  
Timing—7° before top center; alum head 4° before top center.  
Coil Amps., Engine Idling— $\frac{1}{2}$  amp.  
Coil Amps., Engine Stopped— $2\frac{1}{2}$  amp.

#### BATTERY

Amps.—114 amp. hr.

#### LAMPS

Head—No. 2330L.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—25 volt, 20 amp.  
Stop and Tail—Nos. "B" 63 and 87.





# Pierce Arrow Eight

MODEL 1601

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{2}$ "  
Stroke—5"  
Taxable H. P.—39.2.  
Displacement—385.5 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—150 at 3400 r.p.m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—50 links,  $1\frac{1}{2}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Flywheel marking.  
Bearings—Steel-backed, babbitt-lined.  
End Thrust Taken On—Thrust plate.  
Bearing Clearance—.002".

### CONNECTING RODS

End Clearance—.004"-.006".  
Dia. Clearance—.001"-.002".

### COOLING SYSTEM

Capacity—25 qts.  
Pump Drive—Shaft, through generator.  
Belt Size—45°V—52 $\frac{5}{8}$ " x  $\frac{5}{8}$ ".

### CRANKSHAFT

No. Bearings—9.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Front bearing.  
End Clearance—.002"-.004".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg "EE-3."  
Type—Dual downdraft.  
Adjustment—Idle adjustment only—Turn in for lean; out to enrich mixture.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—9 qts.  
Oil Pressure—Direct drive, 50 lbs. at 50 m.p.h.; overdrive, 45 lbs. at 50 m.p.h.  
Adjustment—Non-adjustable.  
Winter Oil—to 0° F. S.A.E. 20W; below 0° F., S.A.E. 10W.  
Summer Oil—S.A.E. No. 30.

### PISTONS

Material—Alum. alloy—Invar strut.  
Clearance—Top—.024".  
Clearance—Bottom—.0025".

### PISTON RINGS

Gap—.013"-.018".  
No. Comp. Rings—3 (1 plain, 2 No. 70 P.C.).  
Width— $\frac{1}{4}$ ".  
No. Oil Rings—1 (No. 85 P.C.).  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Push fit at 160° F.  
Fit in Rod—.0004"-.0006".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.—Int. .3725"; Exh. .3715".  
Seat Angle—45°.  
Seat Width—Not specified.  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—Automatic } .010" for  
Exhaust—Automatic } valve tim'g  
Guides Removable—Yes.  
Spring Pressure  
60-65 lbs. at 28 $\frac{3}{32}$ ".  
60-65 lbs. at 28 $\frac{3}{32}$ ".  
120-128 lbs. at 128 $\frac{3}{32}$ ".

## CHASSIS

### FRONT AXLE

Caster— $\frac{3}{4}$ °.  
Camber—1".  
Toe-in— $1\frac{1}{4}$ ".  
Kingpin Angle—8°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, Hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lash—.002"-.005".  
Diff. Bearing Type—Taper roller.  
Adjustment—Not given.  
End Play—Not given.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Warner synchro-mesh.  
Main Shaft Bearing Type and No.—SSB210 and 308F.  
Countershaft Bearing Type and No.—Plain.

### BRAKES

Type—Mechanical.  
Lining Type—Moulded.  
Lining Size—38" x  $2\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments—One for lining wear.  
One for centralizing.  
Clearance  
Top—.012" rear; front .009".  
Bottom—.012" rear; front .009".  
Brake Effort—55% front; 45% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—SSB 204CP.  
Throwout Bearing Type and No.—Faf. M 2861 C.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Ball bearing type.

### STEERING GEAR

Type—Cam and lever.  
Adjustments  
Column end play—nut at top of housing.  
Cross-shaft end play—screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Owen-Dyneto.  
Drive—Bendix.  
Rotation—Clockwise, drive end.  
No Load—165 amps., 5.4 volts, 1600 r.p.m.  
Lock Torque—25 ft. lbs., 700 amps., 3.8 volts.  
Brush Spring Tension—56-60 oz.

### GENERATOR

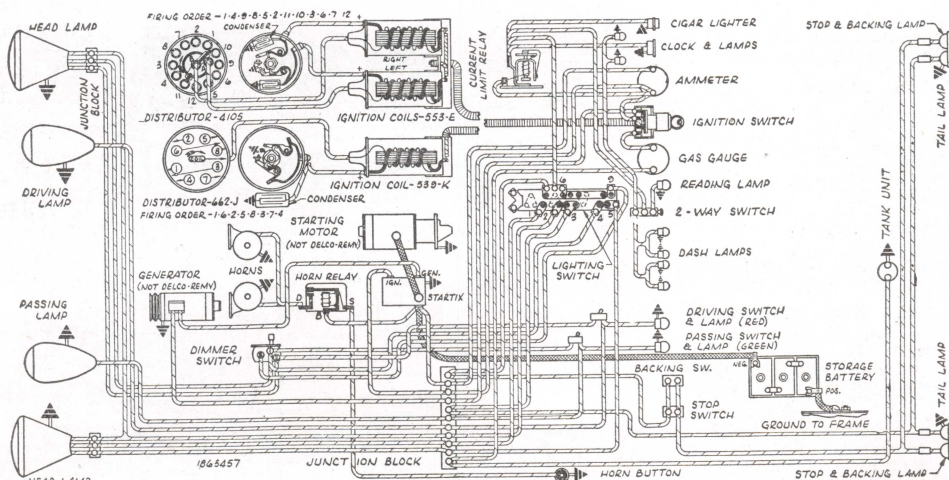
Make—Owen-Dyneto.  
Drive—Two belts.  
Regulation—Third brush and regulator.  
Thermostat—None.  
Output, cold—32 amps., 8.0 volts, 1800 r.p.m.  
Output, hot—28 amps., 8.0 volts, 2800 r.p.m.  
Brush Spring Tension—20-22 oz.  
Rotation—Clockwise, drive end.  
Cutout to Close—6.75-7.5 volts.  
Amps. Discharge to Open—0.5-2.5.  
Field Fuse—5 amps. in regulator.

### IGNITION

Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.018".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.022"-.025".  
Spark Plug Size—Champion 14 m/m "J6."  
Manual Advance—33".  
Automatic Advance—12".  
Timing—5 degrees before top center, spark control advanced.  
Coil Amps., Engine Idling—2.2.  
Coil Amps., Engine Stopped—4.4.

### BATTERY

Amps.—140 amp. hr.



PIERCE-ARROW 1601 "8" - 1602, 1603 "12"



# Pierce-Arrow, Twelve

MODELS 1602 & 1603

## ENGINE

### DATA

No. of Cylinders—12.  
Bore— $3\frac{1}{2}$ "  
Stroke—4"  
Taxable H. P.—58.8.  
Displacement—462 cu. in.  
Firing Order—1-4-9-8-5-2-11-10-3-6-7-12.  
Max. H. P.—185 at 3400 r.p.m.

### CAMSHAFT

Drive—Whitney chain.  
Chain Data—53 links,  $1\frac{1}{2}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Flywheel marking.  
Bearings—Steel-backed, babbitt-lined.  
End Thrust Taken On—Thrust plate.  
Bearing Clearance—.002".

### CONNECTING RODS

End Clearance—.006"-.009".  
Dia. Clearance—.001"-.0025".

### COOLING SYSTEM

Capacity—38 qts.  
Pump Drive—Not given.  
Belt Size—2—45° V— $57\frac{1}{2}$ " x  $\frac{5}{8}$ ".  
Belt Adjustment—Eccentric bracket mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—7.  
Material—Bronze-back babbitt.  
End Thrust Taken On—Front bearing.  
End Clearance—.002"-.004".  
Dia. Clearance—.0015"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg "EX-3."  
Type—Downdraft (2 singles).  
Adjustment—Idle adjustment only—turn in for lean; out for rich.  
Fuel Delivery—Camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—11 qts.  
Oil Pressure—50 lbs. at 50 m.p.h.; 45 lbs. at 50 m.p.h., over drive.  
Adjustment—Non-adjustable.  
Oil { Summer—Above 30° F.—S.A.E. No. 30  
Winter — 0°-30° F.—S.A.E. No. 20W.  
Below 0° F.—S.A.E. No. 10W.

### PISTONS

Material—Lynite T-slot.  
Clearance—Top—.035".  
Clearance—Bottom—.002".

### PISTON RINGS

Gap—Comp. .013"-.021"; Oil .020".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{3}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Push fit at 160° F.  
Fit in Rod—.0004"-.0006".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{16}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.—Int. .373"; Exh. .372".  
Seat Angle—45°.  
Seat Width—Not specified.  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—Automatic.  
Exhaust—Automatic.  
Guides Removable—Yes.  
Spring Pressure—60-65 lbs. at  $2\frac{3}{32}$ ".  
120-128 lbs. at  $1\frac{1}{32}$ ".

## CHASSIS

### FRONT AXLE

Caster— $3\frac{1}{4}$ ".  
Camber—1°.  
Toe-in— $\frac{1}{4}$ ".  
Kingpin Angle—8°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-elliptic—Hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not specified.  
Lash—.002"-.003".  
Diff. Bearing Type—Taper roller.  
Adjustment—Not given.  
End Play—Not given.  
Lubricant Capacity—Housing—6 pts.

### TRANSMISSION

Make and Type—Warner synchro-mesh.

### BRAKES

Type—Mechanical.  
Lining Type—Moulded.  
Lining Size—32" x  $2\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments—One for lining wear.  
One for centralizing.  
Clearance  
Top—Front brake .009"; rear brake .012".  
Bottom—Front brake .009"; rear brake .012".  
Brake Effort—55% front; 45% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Moulded.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Ball-bearing.

### STEERING GEAR

Type—Cam and lever.  
Adjustments  
Column end-play—nut at top of housing.  
Cross-shaft end-play—screw.  
Lubricant—Steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Owen-Dyneto.  
Drive—Bendix.  
Rotation—Clockwise, drive end.  
No Load—165 amps., 5.4 volts, 1600 r.p.m.  
Lock Torque—25 ft. lbs., 700 amps., 3.8 volts.  
Brush Spring Tension—56-60 oz.

### GENERATOR

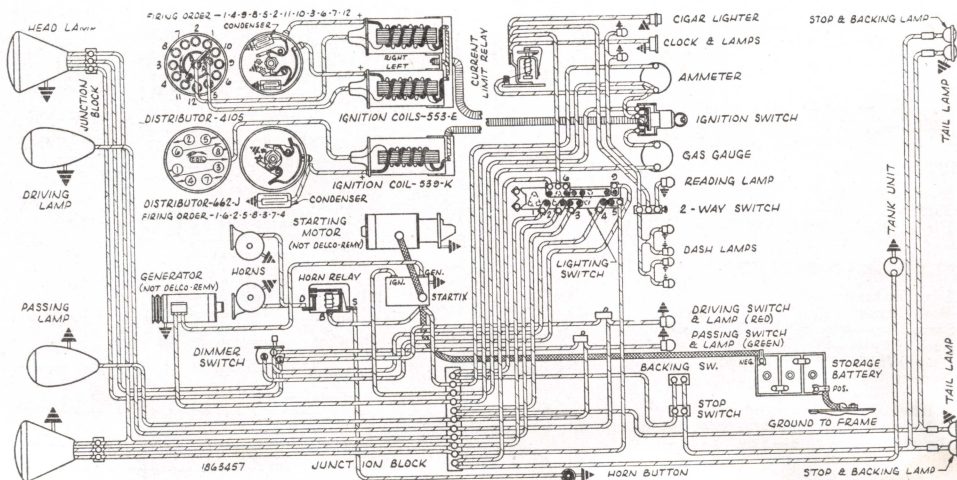
Make—Owen-Dyneto.  
Drive—Two V-belts.  
Regulation—Third brush and regulator.  
Thermostat—None.  
Output, cold—32 amps., 8 volts, 1800 r.p.m.  
Output, hot—28 amps., 8 volts, 2400 r.p.m.  
Brush Spring Tension—20-22 oz.  
Rotation—Clockwise, drive end.  
Cutout to Close—6.75-7.5 volts.  
Amps. Discharge to Open—0.5-2.5.  
Field Fuse—5 amps., in regulator.

### IGNITION

Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.018".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.022"-.025".  
Spark Plug Size—Champion "J6"—14 m/m.  
Manual Advance—33°.  
Automatic Advance—12°.  
Timing—5° before top center, spark control advanced.  
Coil Amps., Engine Idling—2.  
Coil Amps., Engine Stopped—4.

### BATTERY

Amps.—160 amp. hr.



PIERCE-ARROW 1601 "8" - 1602, 1603 "12"



# Plymouth, 1938

MODELS P5 and P6

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—23.44.  
Displacement—201.3 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—82 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—4, removable except rear.  
End Thrust Taken On—End play, .002"-.006".  
Bearing Clearance—Front, .001"-.002"; all others .0015"-.0035".

### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

### COOLING SYSTEM

Capacity— $3\frac{1}{2}$  gals.  
Pump Drive—Fan belt.  
Belt Size—Not given.  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Bronze-backed babbit.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—P-5, Chandler-Groves;  
P-6, Carter "B B," EP-6, Carter "B B."  
Type—Downdraft single.  
Adjustment—"P-5," Turn idle adjustment clockwise for lean, counter-clockwise for richer mixture.  
"P-6,"  $\frac{1}{2}$ - $\frac{1}{4}$  turns open; "EP-6,"  $\frac{1}{4}$  to  $\frac{3}{4}$  turns open.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h., 15 lbs. idling.  
Adjustment—Change spring in relief valve.  
Oil { Average temp. 90° F...S.A.E. 40.  
Average temp. 32° F...S.A.E. 30.  
Average temp. 10° F...S.A.E. 20 W.  
Average temp. -10° F...S.A.E. 10 W.  
Average temp. -25° F...S.A.E. 10 W.  
plus 10% kerosene.

### PISTONS

Material—U-slot, cam-ground, anodized.  
Clearance—Top—.021".  
Clearance—Bottom—.0005"-.001".

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2, undercut.  
Width— $\frac{1}{16}$ ".  
No. Oil Rings—2, slotted.  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Thumb push fit at 100° F.  
Fit in Rod—Thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.— $\frac{3}{32}$ ".  
Seat Angle—45°.  
Seat Width—.0635" ( $\frac{1}{16}$ ").  
Tappet Type—Not given.  
Clearance—Hot: Intake—.006" (for valve timing .011").  
Exhaust—.008" (for valve timing .012").  
Guides Removable—Yes.  
Spring Pressure—34-38 lbs. at  $1\frac{1}{4}$ ".  
77-83 lbs. at  $1\frac{1}{16}$ ".  
Limit of compression  $1\frac{3}{8}$ ".

## CHASSIS

### FRONT AXLE

Caster—P-5, 3°-5°, 4 preferred; P-6, 1°-3°, 2° preferred.  
Camber— $\frac{1}{4}$ °- $\frac{3}{4}$ °,  $\frac{1}{2}$ ° preferred.  
Toe-in—0"- $\frac{1}{8}$ ",  $\frac{1}{16}$ " preferred.  
Kingpin Angle— $4\frac{1}{2}$ °-5 $\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.0015"-.0025" draw (tension).  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $3\frac{3}{4}$  pts.

### TRANSMISSION

Make and Type—Synchro-mesh.  
Main Shaft Bearing Type and No.—Ball.  
Countershaft Bearing Type and No.—Needle roller.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Front shoe  $10\frac{9}{32}$ "x2"x $1\frac{13}{16}$ "  
rear shoe  $7\frac{1}{16}$ "x2"x $1\frac{13}{16}$ ".  
Adjustments—Hand brake,  $17\frac{1}{16}$ "x2"x $5\frac{5}{32}$ ".  
Eccentric for shoe clearance.  
Eccentric anchor for each shoe.  
Clearance—Top—.012".  
Bottom—.006".  
Brake Effort—Not given.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Bushing.  
Throwout Bearing Type and No.—Ball.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded—U.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—shims under lower cover.  
Cross-shaft end play—adjusting screw mesh shims on cross-shaft.  
Lubricant—Summer, S.A.E. 160 or 140.  
Winter, S.A.E. 90.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Manually operated gear.  
Rotation—Clockwise, viewing drive end.  
No Load—P-5, 70 amps., 5.5 volts, 4300 r.p.m.; P-6, 65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—P-5, 11.8 ft. lbs., 560 amps., 4.0 volts; P-6, 18 ft. lbs., 4 volts, 670 amps.  
Brush Spring Tension—42-53 oz., new brushes.

### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—P-5, 18 amps., 8.3 volts, 2300 r.p.m.; P-6, 28-32 amps., 8 volts, 3200 r.p.m.  
Output, hot—P-5, 16 amps., 8.0 volts, 2600 r.p.m.; P-6, 26-29 amps., 8 volts, 3200 r.p.m.  
Brush Spring Tension—P-5, 50-60 oz., new brushes; P-6, 53 oz., new brushes.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7.0 volts at 9.5 m.p.h.  
Amps. Discharge to Open—2.5 amps.  
Field Fuse—None.

### IGNITION

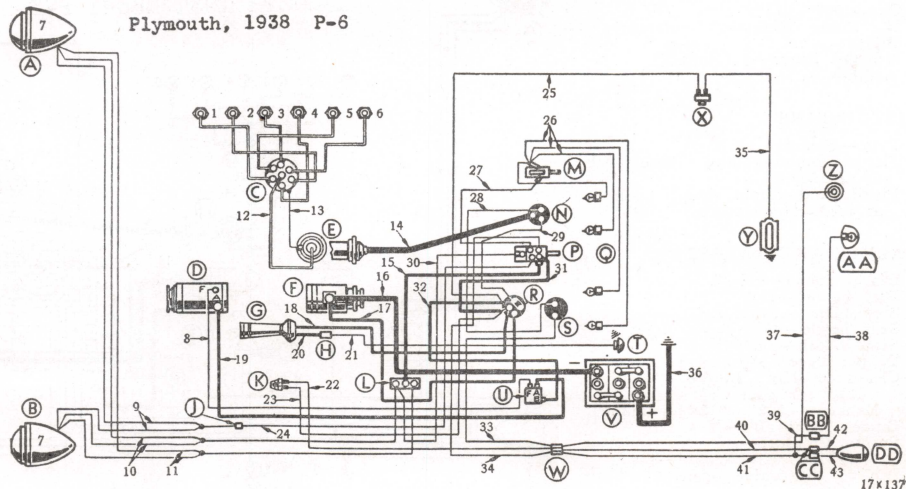
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—P-5, Champion "J-8," 14 m/m; P-6, Auto-Lite "A-7," 14 m/m.  
Manual Advance—None.  
Automatic Advance—22°.  
Vacuum Advance—20°.  
Timing—.007", or 4° past top center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

### BATTERY

Amps.—90 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps., back of ammeter.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Plymouth, 1937

## MODEL P-3

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—23.44.  
Displacement—201.3 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—82 at 3600 r.p.m.

#### CAMSHAFT

Drive—Chain.  
Chain Data—48 links, 1" wide,  $1\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through center of both shafts.  
Bearings—4, babbitt-lined steel except rear.  
End Thrust Taken On—Thrust plate front end. End play—.002"-.006".  
Bearing Clearance—.0015"-.0035".

#### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.0005"-.0025".

#### COOLING SYSTEM

Capacity— $3\frac{3}{4}$  gals.  
Pump Drive—Belt.  
Belt Size—40" V— $48\frac{3}{4}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack, Adj.—Automatic.

#### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—Carter B. & B.  
Type—Downdraft single.  
Adjustment—Idle— $\frac{1}{4}$ - $1\frac{1}{2}$  turns open.  
High speed—fixed jets.  
Fuel Delivery—Mechanical pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30-45 lbs. at 30 m.p.h.  
Adjustment—Replace spring in relief valve.  
Oil { 70°-110° F. .... S.A.E. No. 40  
      40°-110° F. .... S.A.E. No. 30  
      32°-80° F. .... S.A.E. No. 20 or 20W.  
      10°-80° F. .... S.A.E. No. 20W. only  
      -10°-45° F. .... S.A.E. No. 10W. only  
      -30°-20° F. .... S.A.E. No. 10W. plus  
      10% kerosene.

#### PISTONS

Material—Alum. alloy, anodic surface, V-slot.  
Clearance—Top—.022".  
Clearance—Bottom—.0005"-.001".

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2 (undercut).  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Tight thumb push fit at 130° F.  
Fit in Rod—Tight thumb push fit at room temperature.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.— $\frac{3}{16}$ ".  
Seat Angle—45°.  
Seat Width—.0635".  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006" (.011" for timing).  
Exhaust—.008" (.012" for timing).  
Guides Removable—Yes.  
Spring Pressure—  
34-38 lbs. valve closed— $1\frac{3}{4}$ ".  
77-83 lbs. valve open— $1\frac{1}{16}$ ".

### CHASSIS

#### FRONT AXLE

Caster— $1^{\circ}3'$  ( $2^{\circ}$  preferred).  
Camber— $\frac{1}{4}$ °- $\frac{3}{4}$ ° ( $\frac{1}{2}$ ° preferred).  
Toe-in— $0^{\circ}\frac{1}{8}$ " ( $\frac{1}{16}$ " preferred).  
Kingpin Angle— $4\frac{1}{2}$ °- $5\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating hypoid.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Draw tension .004".  
Lash—.006"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing— $\frac{3}{4}$  pts.

#### TRANSMISSION

Make and Type—Three-speed synchro mesh.  
Main Shaft Bearing Type and No.—MRC 207 SFG and 207S.  
Countershaft Bearing Type and No.—Needle type.

#### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size—Front,  $19\frac{13}{16}$ " x 2" x  $1\frac{13}{16}$ ".  
Rear,  $17\frac{19}{64}$ " x 2" x  $1\frac{13}{16}$ ".  
Hand brake,  $16\frac{5}{16}$ " x 2" x  $\frac{5}{32}$ ".

#### Adjustments

Cam adjustment for lining wear.  
Eccentric anchor adjustment.  
Clearance Top—.012".  
Bottom—.006".  
Hand brake, .025".  
Brake Effort—55% front; 45% rear.

#### CLUTCH

Type—Single plate.  
Facing Type—Moulded and woven.  
Pilot Bearing Type and No.—Oilite bronze.  
Throwout Bearing Type and No.—Ball.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—U-Threaded.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments  
Column end play—shims at lower cover.  
Cross-shaft—adjusting screw.  
Mesh—shims under side cover.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Positive shift foot operated.  
Rotation—Clockwise, facing drive end.  
No Load—65 amps., 5.5 volts, 4900 r.p.m.  
Lock Torque—18 ft. lbs., 670 amps., 4 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush on M/P-3; 3rd brush and vibrator type voltage regulator.  
Thermostat—None.  
Output, cold—18 amps. at 8.3 volts.  
Output, hot—12½ amps., 8 volts, 2400 r.p.m.  
Brush Spring Tension—18 oz.  
Rotation—Clockwise, viewing drive end.  
Cutout to Close—7 volts at 9 m.p.h.  
Amps. Discharge to Open—2.0.  
Field Fuse—None.

#### IGNITION

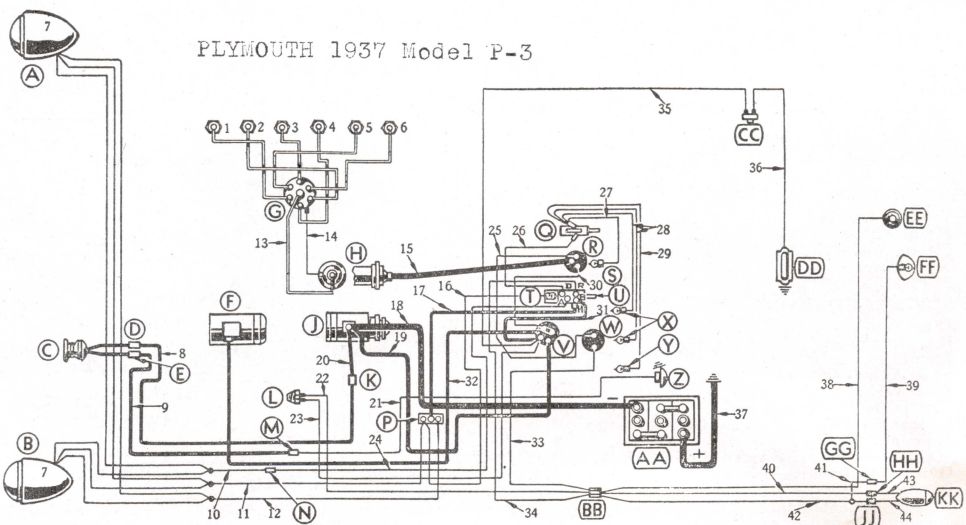
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise, viewed from above.  
Breaker Gap—.020".  
Brush Spring Tension—18-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—14 m/m. Champion "J.8."  
Manual Advance—None.  
Automatic Advance—22°.  
Vacuum Advance—22°.  
Timing—4° or .007" past top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—5.0.

#### BATTERY

Amps.—90 amp. hr.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1158.





# Plymouth 1936

SERIES P1 and P2

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—23.44.  
Displacement—201.31 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—82 at 3600 r.p.m.

### CAMSHAFT

Drive—Chain.  
Chain Data—Morse, 48 links, 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line on shaft centers.  
Bearings—4.  
End Thrust Taken On—Thrust plate, front end. End play .002"-.006"  
Bearing Clearance—No. 1, .001"-.003"; No. 2, 3 and 4, .0015"-.0035".

### CONNECTING RODS

End Clearance—.0055"-.0115".  
Dia. Clearance—.001"-.003".

### COOLING SYSTEM

Capacity— $3\frac{3}{4}$  gals.  
Pump Drive—Belt.  
Belt Size—V-type,  $48\frac{3}{4}$ " x  $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting tension 45-50 lbs.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Nos. 1 and 4, babbit; Nos. 2 and 3, cadmium nickel.  
End Thrust Taken On—Rear.  
End Clearance—.003"-.007".  
Dia. Clearance—Two center .0015"-.0025".  
Front and rear .001"-.002".

### FUEL SYSTEM

Carburetor Make—B. & B.  
Type—Single downdraft.  
Adjustment—Low speed—clockwise, lean; counter-clockwise, rich; high speed fixed.  
Fuel Delivery—Mechanical pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30 to 40 lbs. at 30 m.p.h.  
Adjustment—Spring replacement.  
Winter Oil—S.A.E. No. 20W or No. 10W.  
Summer Oil—S.A.E. No. 30 or No. 40.

### PISTONS

Material—Alum. alloy.  
Clearance—Top—.022".  
Clearance—Bottom—Thrust side, feeler gauge .0005"-.001".

### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2 (slotted).  
Width— $\frac{5}{32}$ ".

### PISTON PINS

Type—Floating mounting.  
Fit in Piston—Tight thumb push fit at 130° F.  
Fit in Rod—Tight thumb push fit at room temperature.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{64}$ ".  
Dia. Intake— $1\frac{13}{64}$ ".  
Stem Dia.— $.340$ ".  
Seat Angle—45°.  
Tappet Type—Mushroom.  
Clearance—Hot: Intake: .006"  
Exhaust: .008". .010" for sustained high speed driving.  
Guides Removable—Yes.  
Spring Pressure—34 to 38 lbs. valve closed  $1\frac{3}{4}$ ", 77 to 83 lbs. valve open  $1\frac{1}{16}$ ".

## CHASSIS

### FRONT AXLE

Caster—1° to 3°—2° preferred.  
Camber— $\frac{1}{4}$ ° to  $\frac{3}{4}$ °— $\frac{1}{2}$ ° preferred.  
Toe-in—0"-. $\frac{1}{8}$ ".  
Kingpin Angle— $9\frac{1}{2}$ ° + or -  $\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.004" draw (tension).  
Lash—.006" to .008".  
Diff. Bearing Type—Taper roller.  
Adjustment—Thread.  
End Play—.016" spread.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pt.  
Summer—S.A.E. No. 160.  
Winter—S.A.E. No. 90.

### TRANSMISSION

Make and Type—Own helical gear, synchromesh.  
Main Shaft Bearing Type and No.—M. R. C. 2075 F. G. and M. R. C. 2075.  
Countershaft Bearing Type and No.—Roller.

### BRAKES

Type—Hydraulic.  
Lining Type—Moulded.  
Lining Size— $19\frac{13}{16}$ " x  $2\frac{1}{2}$ " x  $1\frac{3}{64}$ ".  
Hand brake,  $18\frac{13}{32}$ " x  $2\frac{1}{2}$ " x  $5\frac{1}{32}$ ".  
Adjustments—Eccentric for lining wear.  
Anchor adjustment for relining.  
Clearance  
Top—.012"  
Bottom—.006"  
Hand Brake— $\frac{1}{16}$ ".  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—Single plate.  
Facing Type—Moulded and woven.  
Pilot Bearing Type and No.—Bronze.  
Throwout Bearing Type and No.—Nice 5068-1.

### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread, silent "U."

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end plate—shims at bottom. Cross-shaft—adjusting screw in housing. Mesh—shims.  
Lubricant—Fluid gear lubricant—  
Winter, S.A.E. No. 90.  
Summer, S.A.E. No. 160.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Manual shift pinion.  
Rotation—Clockwise facing drive end.  
No Load—Not available.  
Lock Torque—13 ft. lbs., 525 amps., 3.4 volts.  
Brush Spring Tension—18 oz.

### GENERATOR

Make—Auto-Lite.  
Drive—Fan belt.  
Regulation—Voltage control and third brush.  
Thermostat—None.  
Output, cold—21 amps. at 8.3 volts at 2400 r.p.m.  
Output, hot—18 amps. at 8.3 volts at 2400 r.p.m.  
Brush Spring Tension—18 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.5 to 7.3 volts.  
Amps. Discharge to Open—0 to 3 amps.  
Field Fuse—6 amps.

### IGNITION

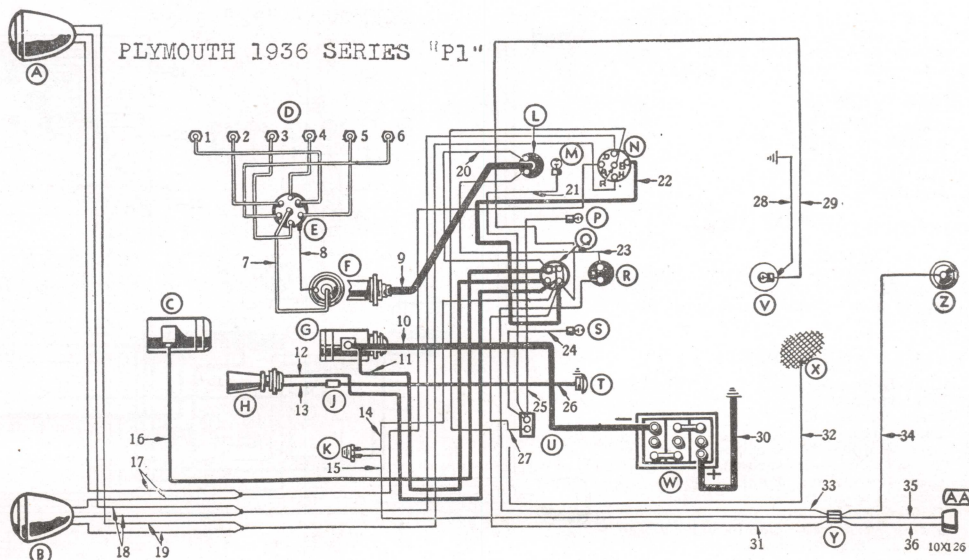
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise from above.  
Breaker Gap—.020".  
Brush Spring Tension—9 to 13 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—"S-9"—14 m/m.  
Manual Advance—None.  
Automatic Advance—18°.  
Timing—4° after top dead center.  
Coil Amps., Engine Idling—2.5.  
Coil Amps., Engine Stopped—5.5.

### BATTERY

Amps.—86 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—20 amps.  
Dome—No. 87.  
Stop and Tail—No. 1130.





# Plymouth 6, 1935

## MODEL PJ

### ENGINE

#### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—23.44.  
Displacement—201.3 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—82 at 3600 r.p.m.

#### CAMSHAFT

Drive—Silent chain—non-adjustable.  
Chain Data—48 links 1" wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Timing marks on sprockets opposite each other.  
Bearings—4—3 babbitt lined—rear in block.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—.0015"-.0025".

#### CONNECTING RODS

End Clearance—.003"  
Dia. Clearance—.001".

#### COOLING SYSTEM

Capacity— $3\frac{3}{4}$  gals.  
Pump Drive—Belt.  
Belt Size—V— $48\frac{1}{16}$ " x  $2\frac{5}{32}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Packless type.

#### CRANKSHAFT

No. Bearings—4.  
Material—Removable, babbitt lined steel.  
End Thrust Taken On—Rear bearing.  
End Clearance—.003"-.007".  
Dia. Clearance—.001"-.002".

#### FUEL SYSTEM

Carburetor Make—B. & B.  
Type—Down draft, plain tube.  
Adjustment:  
Idle adjustment only.  
High speed, fixed jets.  
Fuel Delivery—Mechanical fuel pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—5 qts.  
Oil Pressure—30 to 60 lbs. at normal driving speeds.  
Adjustment—Non-adjustable—replace springs in valve.  
Winter Oil—S.A.E. No. 20W or 10W.  
Summer Oil—S.A.E. No. 30.

#### PISTONS

Material—Alum. alloy—T-slot cam ground.  
Clearance—Top—Not given.  
Clearance—Bottom—.001"-.0015".

#### PISTON RINGS

Gap—.007"-.015".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—2.  
Width— $\frac{5}{32}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—Tight thumb push fit at 120°F.  
Fit in Rod—Tight thumb push fit at 70°F.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{5}{32}$ ".  
Dia. Intake— $1\frac{1}{16}$ ".  
Stem Dia.— $\frac{3}{16}$ ".  
Seat Angle—45°.  
Seat Width—Not specified.  
Tappet Type—Mushroom.  
Clearance—Hot: Intake—.006".  
Exhaust—.008".  
Guides Removable—Yes.  
Spring Pressure—34-38 lb. valve closed.  
77-83 lb. valve open.

### CHASSIS

#### FRONT AXLE

Caster—1° to 3°—2° preferred.  
Camber— $\frac{1}{4}$ " + or -  $\frac{1}{4}$ ".  
Toe-in— $0\frac{1}{2}$ "- $\frac{3}{4}$ ".  
Kingpin Angle—8°-30'.  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating—spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.004"-.006", draw.  
Lash—.005"-.010".  
Diff. Bearing Type—Taper roller.  
Adjustment—Adjusting nut.  
End Play—.016" tension.  
Lubricant Capacity—Housing— $3\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Helical gear.  
Main Shaft Bearing Type and No.—M. R. C. 207 F. G.  
Countershaft Bearing Type and No.—Straight roller.

#### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Moulded.  
Lining Size— $19\frac{3}{16}$ " x  $2\frac{3}{16}$ ", Hand brake  $18\frac{1}{32}$ " x  $2\frac{5}{32}$ ".  
Adjustments:  
Cam adjustment at each shoe for lining wear.  
Clearance:  
Heel—.005".  
Toe—.010".  
Brake Effort—50-50.

#### CLUTCH

Type—Single plate, ventilated, knife-edge type.  
Facing Type—Asbestos.  
Pilot Bearing Type and No.—Bronze.  
Throwout Bearing Type and No.—Nice 5068-1.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—U—threaded.

#### STEERING GEAR

Type—Worm and roller.  
Adjustments:  
Column end play—shims at lower cover.  
Cross-shaft—adjusting screw.  
Mesh—shims at housing cover.  
Lubricant—Fluid gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Mechanical positive shift.  
Rotation—Clockwise facing drive end.  
No Load—Not available.  
Lock Torque—13 ft. lbs., 525 amps., 3.4 volts.  
Brush Spring Tension—18 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Voltage control and third brush.  
Thermostat—None.  
Output, cold—21 amps., 8.6 volts, 2400 r.p.m. M/"PJ" DeLuxe. 18 amps., 8.3 volts, 2400 r.p.m. M/"PJ" Std.  
Output, hot—18½ amps., 8.4 volts, 2400 r.p.m. M/"PJ" DeLuxe. 15.2 amps., 8 volts, 2400 r.p.m. M/"PJ" Std.  
Brush Spr. Tension—18 oz.  
Cutout to Close—6.5 to 7.3 volts.  
Amps. Discharge to Open—0-3 amps.  
Field Fuse—M/"PJ"—5 amps. None M/"PJ" Std.

#### IGNITION

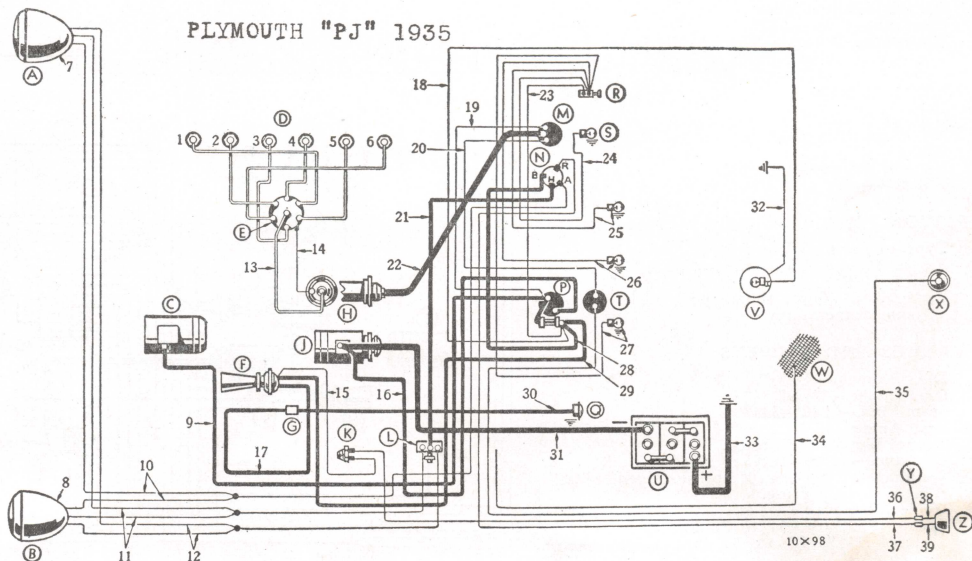
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Clockwise from above.  
Breaker Gap—.020".  
Brush Spr. Tension—18 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—14m/m A. C. K-9.  
Manual Advance—None.  
Automatic Adv.—18° engine. Vacuum advance 10°.  
Timing—4° or .007" piston travel past top dead center.  
Coil Amps., Engine Idling—2.5 amps.  
Coil Amps. Engine Stopped—5.5 amps.

#### BATTERY

Amps.—86 amp. hr.—13 plate.

#### LAMPS

Head—Mazda 2320-C.  
Park—Mazda 55.  
Instrument—Mazda 63.  
Fuse—20 amp. back of ammeter.  
Dome—Mazda 87.  
Stop and Tail—Mazda 1158.





# Plymouth 6, PF, PE and PG, 1934

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{8}$ ". Stroke— $4\frac{3}{8}$ ".  
Taxable H. P.—23.44.  
Displacement—201.3 cu. in.  
Firing Order—1-5-3-6-2-4.  
Maximum H. P.—77 at 3600 r.p.m. (5.8 ratio).

### CAMSHAFT

Drive—Silent chain.  
Chain Data—48 links;  $\frac{1}{2}$ " pitch; no adjustment.  
Valve Timing—Checked at front by marks on sprocket; opposite and in line.  
Bearings—4, babbitt-lined steel.  
End Thrust—Taken on thrust plate behind sprocket hub. End Play—.003"-.005".  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.003"-.009".  
Diameter Clearance—.001"-.00275".

### COOLING SYSTEM

Capacity— $3\frac{1}{2}$  gallons.  
Pump Drive—V-belt.  
Belt Adjustment—Shifting generator.  
Pump Packing Adjustment—None.

### CRANKSHAFT

No. Bearings—4.  
Material—Babbitt-lined steel.  
End Thrust—Taken on rear.  
End Clearance—.003"-.007".  
Diameter Clearance—.001"-.002".

### FUEL SYSTEM

Carburetor Make—Special.  
Type—Plain tube, downdraft.  
Adjustment—Idle only; in, lean; out, rich.  
Fuel level  $\frac{1}{8}$ " below surface of float chamber.  
Fuel Delivery—Pump.

### LUBRICATION

Type—Forced feed.  
Pump Type—Gear.  
Capacity—5 quarts.  
Oil Pressure—30 lbs. at 25 m.p.h.  
Adjustment—Relief valve spring replacement.  
Winter Oil—S. A. E. No. 20-W or 10-W.  
Summer Oil—S. A. E. No. 30.

### PISTONS

Material—Aluminum.  
Clearance—Top, .022".  
Bottom, .0015".

### PISTON RINGS

Gap—.007"-.015".  
No. Compression Rings—3, (one recessed), early models; 2, late models.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1, early models; 2, late models.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Floating.  
Fit in Piston—Light thumb-push fit at 120° F.  
Fit in Rod—Light thumb-push fit at 70° F.

### VALVES AND TAPPETS

Diameter Exhaust— $1\frac{1}{8}$ ".  
Diameter Intake— $1\frac{1}{8}$ ".  
Stem Diameter—.340"-.341".  
Seat Angle—45°.  
Seat Inserts—Exhaust.  
Tappet Type—Mushroom.  
Clearance:  
Hot: Intake, .006" (timing, .011").  
Exhaust, .008" (timing, .012").  
Guides Removable?—Yes.  
Spring Pressure—77-85 lbs., compressed.

## CHASSIS

### FRONT AXLE

Caster— $1\frac{1}{2}$ °.  
Camber— $\frac{1}{2}$ °.  
Toe-in—0" -  $\frac{1}{8}$ ".  
Kingpin Angle—Including camber angle, 10°.  
Tie Rod Adjustment—Threaded sockets.

### REAR AXLE

Type—Semi-floating.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—.004"-.006".  
Lash—.005"-.010".  
Differential Bearing Type—Taper roller.  
Adjustment—Threaded nuts.  
End Play—.016".  
Lubricant Capacity Housing— $3\frac{3}{4}$  pints.

### BRAKES

Type—Two-shoe hydraulic.  
Lining Type—Molded.  
Lining Size—P. F.,  $\frac{1}{8}$ " x 2".  
P. E.,  $\frac{1}{8}$ " x 2".  
Adjustments—Anchor Bolt, eccentric.  
Shoes, cams.  
Clearance—Toe, .010".  
Heel, .005" front, .007" rear shoe.

### CLUTCH

Type—Single plate dry.  
Facing Type—Molded, 9" disc.

### SPRINGS

Type Front—Coil, independent springing.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent U-thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments:  
Worm Shaft—Shims and spring washers.  
Cross Shaft—Adjusting screw.  
Gear Mesh—Shims.  
Lubricant—Fluid gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy No. 734-H.  
Drive—Overrunning clutch.  
Rotation—Clockwise, viewing pinion.  
No Load—65 amps., 5 volts, 5000 r.p.m.  
Lock Torque—12 ft. lbs., 475 amps., 3.63 volts.  
Brush Spring Tension—24-28-oz.

### GENERATOR

Make—Delco-Remy, No. 937P (P. E.);  
No. 937G, (P. F.)  
Drive—Fan belt.  
Regulation—Third brush, external voltage on P. E.  
Thermostat—None.  
Output, Cold:  
Model P. E.,  
19-22 amps., 8.5 volts, 2400 r.p.m.  
Model P. F.,  
15-17 amps., 8.0 volts, 1900 r.p.m.  
Output, Hot:  
Model P. E.,  
12-15 amps., 7.8 volts, 2600 r.p.m.  
Model P. F.,  
10-13 amps., 7.6 volts, 2100 r.p.m.  
Brush Spring Tension:  
Model P. E., 22-26-oz.; 3rd, 16-20-oz.  
Model P. F., 14-18-oz.  
Rotation—Clockwise, viewing from drive end.  
Cutout to Close—6.75 volts.  
Amps. Discharge to Open:  
Model P. E., 3 amps. maximum;  
Model P. F., 2.5 amps.  
Field Fuse—P. E., 6 amps. (no higher) in control unit.

### IGNITION

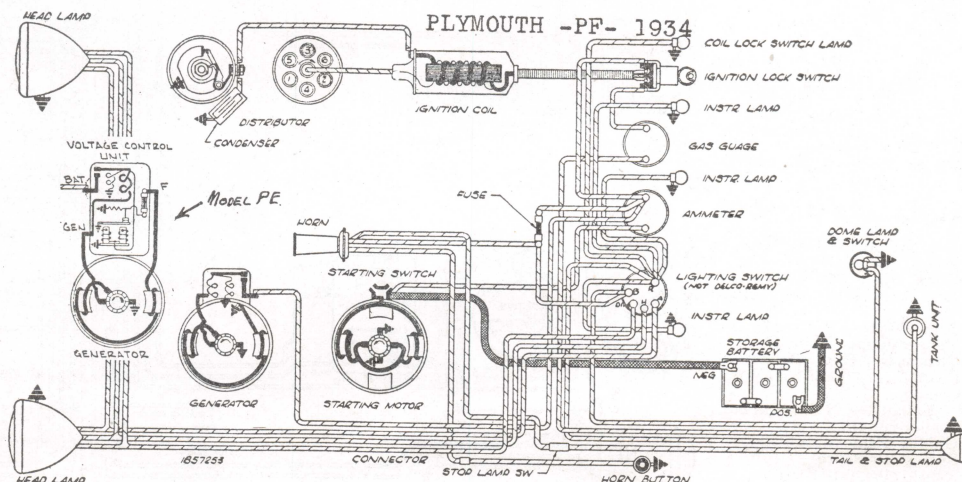
Distributor—Delco-Remy; P. E., No. 644K;  
P. F., No. 622.  
Coil and Switch—Delco-Remy, No. 540A.  
Distributor Rotation—Counter-clockwise, viewing from drive end.  
Breaker Gap—.020".  
Arm Spring Tension—9-13-oz.  
Spark Plug Gap—.025".  
Spark Plug Size—14 mm.; S9 standard head, SL9, aluminum head.  
Automatic Advance—PF, 18° max.; PE, 32° max.  
Timing—P. F., 9° or .032".  
B. T. C., marks on flywheel.  
P. E., 3° or .004".  
A. T. C. marks on impulse neutralizer.  
Coil Amps., Engine Idling, 2 amps.  
Engine Stopped, 4.5 amps.

### BATTERY

Amps.—84 at 5 amps. discharge.

### LAMPS

Head—Mazda, No. 1116, PE; No. 1110, PF.  
Park—Mazda, No. 63.  
Instrument—Mazda, No. 63.  
Fuse—20 amp., on back of ammeter.  
Dome—P. E., Mazda No. 87;  
P. F., Mazda No. 81.  
Stop and Tail—Mazda No. 1158.





# Pontiac 6, 1938

MODEL 38-26DA

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{1}{16}$ ".  
Stroke—4".  
Taxable H. P.—28.3.  
Displacement—222.7 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—85 at 3520 r.p.m.

### CAMSHAFT

Drive—Morse.  
Chain Data—56 links, 1" wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—"0" marks on sprockets opposite each other on line through shaft centers.  
Bearings—4, steel-backed babbitt.  
End Thrust Taken On—Thrust plate front end, end play .002"-.005".  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0005"-.0015".

### COOLING SYSTEM

Capacity—16 qts.  
Pump Drive—Fan belt.  
Belt Size—28"V,  $46\frac{1}{16}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Automatic.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed white bearing metal alloy.  
End Thrust Taken On—Rear center.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter W-1401S.  
Type—Downdraft, single.  
Adjustment—Idle— $\frac{3}{4}$  to  $1\frac{1}{2}$  turns open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—6 qts.  
Oil Pressure—35-40 lbs. above 40 m.p.h.  
Adjustment—Non-adjustable.  
Oil { Average daytime temperature, 90° F. or higher, S.A.E. No. 30.  
32° F.-110° F.—S.A.E. No. 20W. or 20.  
10° F.-110° F.—S.A.E. No. 20W.  
10° F.-70° F.—S.A.E. No. 10W.  
30° F.-20° F.—S.A.E. No. 10W., plus 10% kerosene.

### PISTONS

Material—Chrome-nickel iron, tin-plated.  
Clearance—Top—.023".  
Clearance—Bottom—.002" with  $\frac{1}{2}$ " feeler.

### PISTON RINGS

Gap—.007"-.017".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—Under 200 to 300 pounds.  
Fit in Rod—.0003"-.0005".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{19}{32}$ ".  
Stem Dia.— $\frac{3}{16}$ ".  
Seat Angle—Int. 30°, Exh. 45°.  
Seat Width—Not given.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.011"-.013" hot and running.  
Exhaust—.011"-.013" hot and running.  
Guides Removable—Yes.  
Spring Pressure  
54½ lbs. at  $1\frac{1}{2}$ ".  
96 lbs. at  $1\frac{3}{4}$ ".

## CHASSIS

### FRONT AXLE

Caster— $\frac{3}{4}$ "— $-1\frac{1}{4}$ " (curb weight).  
Camber— $-\frac{1}{2}$ "— $+1$ " (curb weight).  
Toe-in—0"-. $\frac{1}{16}$ ".  
Kingpin Angle— $4\frac{1}{2}$ "-5".  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating spiral bevel.  
Pinion Bearing Type—N. D. No. 905306 and Hyatt No. 107391.  
Adjustment—Shims.  
End Play—Not given.  
Lash—Min. .003".  
Diff. Bearing Type—Hyatt roller No. 127861.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed, helical gear.  
Main Shaft Bearing Type and No.—N. D. Ball No. 954144 and 907506.  
Countershaft Bearing Type and No.—Bronze .867" x .993" x 2".

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $23\frac{1}{16}$ " x  $1\frac{3}{4}$ " x  $\frac{9}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Eccentric anchor adjustment.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—52% front, 48% rear.

### CLUTCH

Type—Own.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Hyatt roller No. 142655.  
Throwout Bearing Type and No.—Graphite ring  $1\frac{1}{2}$ " x  $2\frac{3}{8}$ " x  $\frac{3}{4}$ ".

### SPRINGS

Type Front—Coil.  
Type Rear—Semielliptic.  
Shackle Adjustment—Thread (rear only).

### STEERING GEAR

Type—Saginaw worm and roller.  
Adjustments—Column end-play—adjusting screw at bottom.  
Cross-shaft end-play—adjusting screw.  
Mesh—Adjusting plate at bottom.  
Lubricant—All-season steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 729E|  
Drive—Manual shift.  
Rotation—Clockwise viewing pinion.  
No Load—60 amps., 5.0 volts, 6000 r.p.m.  
Lock Torque—16 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy No. 1100003.  
Drive—Fan belt.  
Regulation—3rd brush with voltage regulator.  
Thermostat—None.  
Output, cold—26-30 amps., 8 volts, 3300 r.p.m.  
Output, hot—24-28 amps., 8 volts, 3300 r.p.m.  
Brush Spring Tension—Not given.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.5 to 7.25 volts.  
Amps. Discharge to Open—3.0 max. at 6.3 volts.  
Field Fuse—None.

### IGNITION

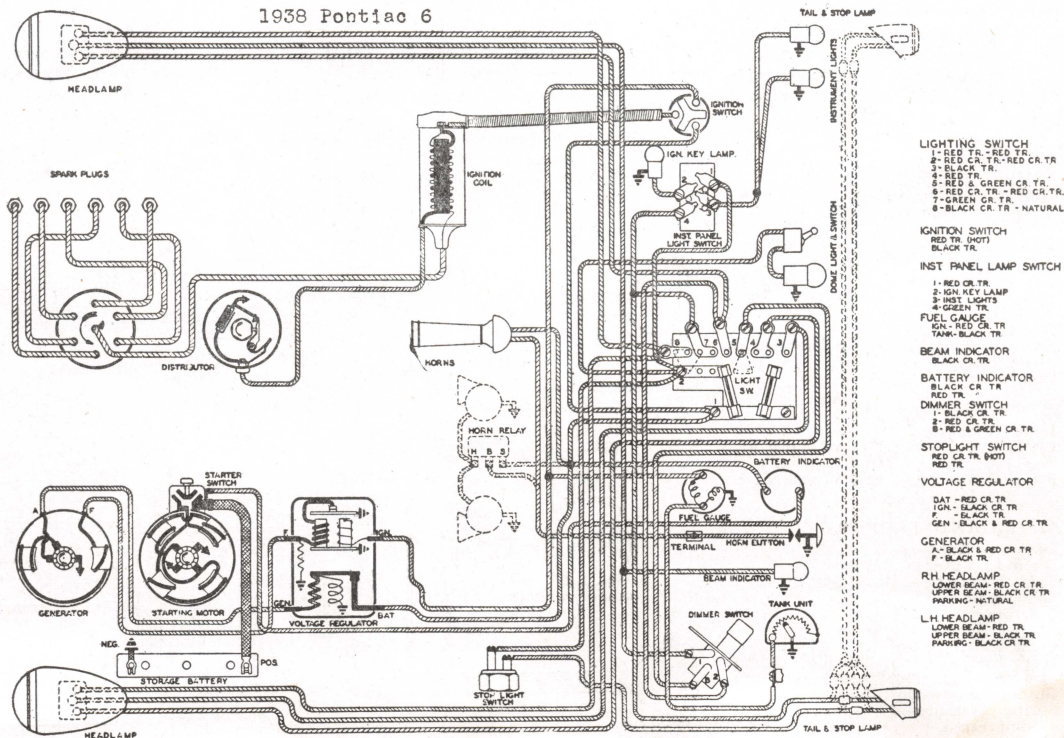
Distributor—Delco-Remy 647-D.  
Coil—Delco-Remy 539L.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—17-21 oz.  
Spark Plug Gap—.025" (.022" on radio cars).  
Spark Plug Size—14 m/m A. C. Model 45-14.  
Manual Advance—20°.  
Automatic Advance—22°.  
Vacuum Advance—15°.  
Timing—2° to 6° before top dead center.  
Coil Amps., Engine Idling—Not given.  
Coil Amps., Engine Stopped—Not given.

### BATTERY

Amps.—Delco, 98 amp. hour

### LAMPS

Head—2320L.  
Park—55.  
Instrument—55.  
Fuse—3A-20 amps.  
Dome—81L.  
Stop and Tail—87L.





# Pontiac 8, 1938

MODEL 38-28DA

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $3\frac{3}{4}$ "  
Taxable H. P.—33.8.  
Displacement—248.9 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—100 at 3700 r.p.m.

### CAMSHAFT

Drive—Morse chain.  
Chain Data—56 links,  $2\frac{7}{32}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—"0" marks on sprockets opposite each other on line through shaft centers.  
Bearings—5, steel-backed babbit.  
End Thrust Taken On—Thrust plate front end, end play .002"-.005".  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0005"-.0015".

### COOLING SYSTEM

Capacity—19 qts.  
Pump Drive—Fan belt.  
Belt Size—28° V— $46\frac{1}{16}$ " x  $\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adjustment—Automatic.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel-backed white bearing metal alloy.  
End Thrust Taken On—Rear center.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter W-1400S.  
Type—Downdraft, single.  
Adjustment—Idle— $\frac{1}{2}$ — $\frac{1}{4}$  turns, open.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—35-40 lbs. above 40 m.p.h.  
Adjustment—Non-adjustable.  
Oil { Average daytime temperature, 90° F. or higher, S.A.E. No. 30.  
32° F.-110° F.—S.A.E. No. 20W. or 20.  
10° F.-110° F.—S.A.E. No. 20W.  
10° F.-70° F.—S.A.E. No. 10W.  
-30° F.-+20° F.—S.A.E. No. 10W., plus 10% kerosene.

### PISTONS

Material—Chrome-nickel iron, tin-plated.  
Clearance—Top—.023".  
Clearance—Bottom—.002" with  $\frac{1}{4}$ " feeler.

### PISTON RINGS

Gap—.007"-.017".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in piston.  
Fit in Piston—Under 200 to 300 pounds.  
Fit in Rod—.0003"-.0005".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.—.310"-.311".  
Seat Angle—Int. 30°, Exh. 45°.  
Seat Width—Not given.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.011"-.013" hot and running.  
Exhaust—.001"-.013" hot and running.  
Guides Removable—Yes.  
Spring Pressure— $54\frac{1}{2}$  lbs. at  $129\frac{1}{2}$ ".  
96 lbs. at  $119\frac{1}{2}$ ".

## CHASSIS

### FRONT AXLE

Caster— $-\frac{3}{4}$ " to  $-1\frac{1}{4}$ " (curb weight).  
Camber— $-\frac{1}{2}$ " to  $+1$ " (curb weight).  
Toe-in—0"-. $\frac{1}{16}$ ".  
Kingpin Angle— $4\frac{1}{2}$ °-5°.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—N. D. No. 905306 and Hyatt No. 107391.  
Adjustment—Shims.  
End Play—Not given.  
Lash—Min. .003".  
Diff. Bearing Type—Hyatt roller No. 127861.  
Adjustment—Thread.  
End Play—Not given.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own, 3-speed, helical gear.  
Main Shaft Bearing Type and No.—N. D. Ball No. 954144 and 907506.  
Countershaft Bearing Type and No.—Bronze .867" x .993" x  $\frac{1}{4}$ ".

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Moulded.  
Lining Size— $23\frac{1}{16}$ " x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Eccentric anchor adjustment.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—52% front, 48% rear.

### CLUTCH

Type—Own.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Hyatt roller No. 142655.  
Throwout Bearing Type and No.—Graphite ring  $1\frac{1}{2}$ " x  $2\frac{3}{8}$ " x  $\frac{3}{4}$ ".

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded (rear only).

### STEERING GEAR

Type—Saginaw worm and roller.  
Adjustments—Column end play—adjusting screw at bottom.  
Cross-shaft end play—adjusting screw mesh—Adjusting plate at bottom.  
Lubricant—All season steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 727S.  
Drive—Electrically controlled manual shift.  
Rotation—Clockwise viewing pinion.  
No Load—60 amps., 5.0 volts, 6000 r.p.m.  
Lock Torque—15 ft. lbs., 600 amps., 3.0 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy No. 1100003.  
Drive—Fan belt.  
Regulation—3rd brush and voltage regulator.  
Thermostat—None.  
Output, cold—26-30 amps., 8 volts, 3300 r.p.m.  
Output, hot—24-28 amps., 8 volts, 3300 r.p.m.  
Brush Spring Tension—Not given.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.5 to 7.25 volts.  
Amps. Discharge to Open—3.0 max. at 6.3 volts.  
Field Fuse—None.

### IGNITION

Distributor—Delco-Remy 663X.  
Coil—Delco-Remy 539L.  
Distr. Rotation—Center-clockwise.  
Breaker Gap—.015".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.025" (.022" on radio cars).  
Spark Plug Size—14 m/m A. C., Model No. 45-14.  
Manual Advance—20°.  
Automatic Advance—22°.  
Vacuum Advance—20°.  
Timing—2° to 6° before top dead center.  
Coil Amps., Engine Idling—Not given.  
Coil Amps., Engine Stopped—Not given.

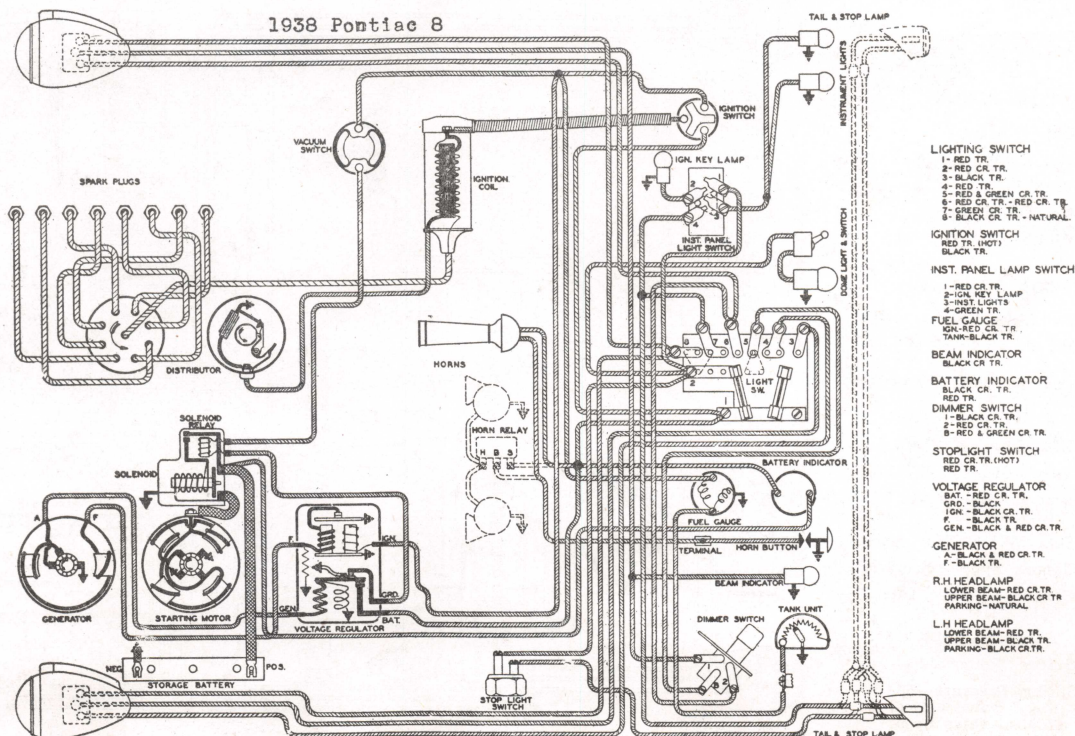
### BATTERY

Amps.—Delco, 112 amp. hour.

### LAMPS

Head—2320L.  
Park—55.  
Instrument—55.  
Fuse—3A-20 amps.  
Dome—81L.  
Stop and Tail—87L.

1938 Pontiac 8









# Pontiac 8, 1937

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{4}$ "  
Stroke— $3\frac{3}{4}$ "  
Taxable HP.—33.8.  
Displacement—248.9 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. HP.—100 at 3800 r.p.m.

### CAMSHAFT

Drive—Silent chain.  
Chain Data—56 links,  $2\frac{7}{32}$ " wide,  $\frac{3}{8}$ " pitch.  
Valve Timing—Sprocket marks opposite each other on line through shaft centers.  
Bearings—5, steel backed, babbitt lined.  
End Thrust Taken On—Thrust plate.  
Bearing Clearance—.0015"-.0025".

### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.0005"-.0015".

### COOLING SYSTEM

Capacity—19 qts.  
Pump Drive—Fan belt.  
Belt Adjustment—Generator link.  
Pump Pack, Adj.—Thread.

### CRANKSHAFT

No. Bearings—5.  
Material—Steel backed, Babbitt lined.  
End Thrust Taken On—Rear center.  
End Clearance—.003"-.008".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Carter.  
Type—Down draft single.  
Adjustment—Idle  $\frac{1}{4}$ -1 turn open;  
High speed, fixed jet.  
Fuel Delivery—A-C camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—7 qts.  
Oil Pressure—35-45 lbs. warm oil, average speed.  
Adjustment—Non-Adjustable.

Oil {  $50^{\circ}$ - $110^{\circ}$  F.—S. A. E. No. 30.  
           $30^{\circ}$ - $110^{\circ}$  F.—S. A. E. No. 20.  
           $10^{\circ}$ - $110^{\circ}$  F.—S. A. E. No. 20-W.  
           $-10^{\circ}$ - $60^{\circ}$  F.—S. A. E. No. 10-W.  
           $-30^{\circ}$ - $20^{\circ}$  F.—S. A. E. No. 10-W. plus  
          10% Kerosene.

### PISTONS

Clearance—Bottom—.002"  
with  $\frac{1}{2}$ " feeler.

### PISTON RINGS

Gap—.007"-.017".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in piston.  
Fit in Rod—.0003"-.0005".

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{11}{32}$ ".  
Dia. Intake— $1\frac{15}{32}$ ".  
Stem Dia.— $.310$ "-. $.311$ ".  
Seat Angle—Intake  $30^{\circ}$ , exhaust  $45^{\circ}$ .  
Seat Width—Not given.  
Tappet Type—Cylindrical.  
Clearance—Hot: Intake—.011"-.013".  
Exhaust—.011"-.013".  
Guides Removable—Yes.  
Spring Pressure—56 lbs., at  $12\frac{1}{2}$ " valve closed;  
96 lbs. valve open.

## CHASSIS

### FRONT AXLE

Caster— $-\frac{1}{2}^{\circ}$ -. $\frac{1}{4}^{\circ}$  (5 pass. load).  
Camber— $-\frac{1}{8}^{\circ}$ - $1^{\circ}$  (5 pass. load).  
Toe-in— $0$ "- $\frac{3}{16}$ " (5 pass. load).  
Kingpin Angle— $4^{\circ}$ - $52'$ .  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—N. D. 5306 and Hyatt C 1509.  
Adjustment—Shims.  
End Play—Varies with pinion marking.  
Lash—Not less than .003" or over .010".  
Diff. Bearing Type—Hyatt KA 11360Z.  
Adjustment—Thread.  
End Play— $1\frac{1}{2}$ " to  $2\frac{1}{2}$ " notches tight.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Own synchro-mesh.  
Main Shaft Bearing Type and No.—ND Ball 47507 and 3206.  
Countershaft Bearing Type and No.—Bronze.

### BRAKES

Type—Bendix hydraulic.  
Lining Type—Molded.  
Lining Size— $23\frac{1}{16}$ " $\times$  $1\frac{3}{4}$ " $\times$  $9\frac{1}{16}$ ".  
Adjustments—Eccentric for centralizing; adjusting screw for clearance; Anchor eccentric type.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—52% front; 48% rear.

### CLUTCH

Type—Single plate.  
Facing Type—Woven.  
Pilot Bearing Type and No.—Hyatt 99004.  
Throwout Bearing Type and No.—Carbon  $1\frac{1}{2}$ " $\times$  $2\frac{5}{8}$ " $\times$  $\frac{3}{4}$ ".

### SPRINGS

Type Front—Coil.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Worm and roller.  
Adjustments—Column end play—adjusting nut at bottom. Cross shaft end play—adjusting screw. Mesh—eccentric at bottom.  
Lubricant—11 oz. steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy 727-S.  
Drive—Over-running clutch.  
Rotation—Clockwise viewing drive pinion.  
No Load—65 amps, 5 volts, 5000 r.p.m.  
Lock Torque—15 ft. lbs., 600 amps, 3 volts.  
Brush Spring Tension—22-28 oz.

### GENERATOR

Make—Delco-Remy 748-S.  
Regulation—External voltage regulation.  
Output, cold—22-26 amps., 8.7 to 9.1 volts, 3300 r.p.m.  
Output, hot—18-21 amps., 8.2 to 8.7 volts, 3500 r.p.m.  
Brush Spr. Tension—Main 22-26 oz., Third, 16 to 20 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.5 volts at 10 m.p.h.  
Amps. Discharge to Open—0.

### IGNITION

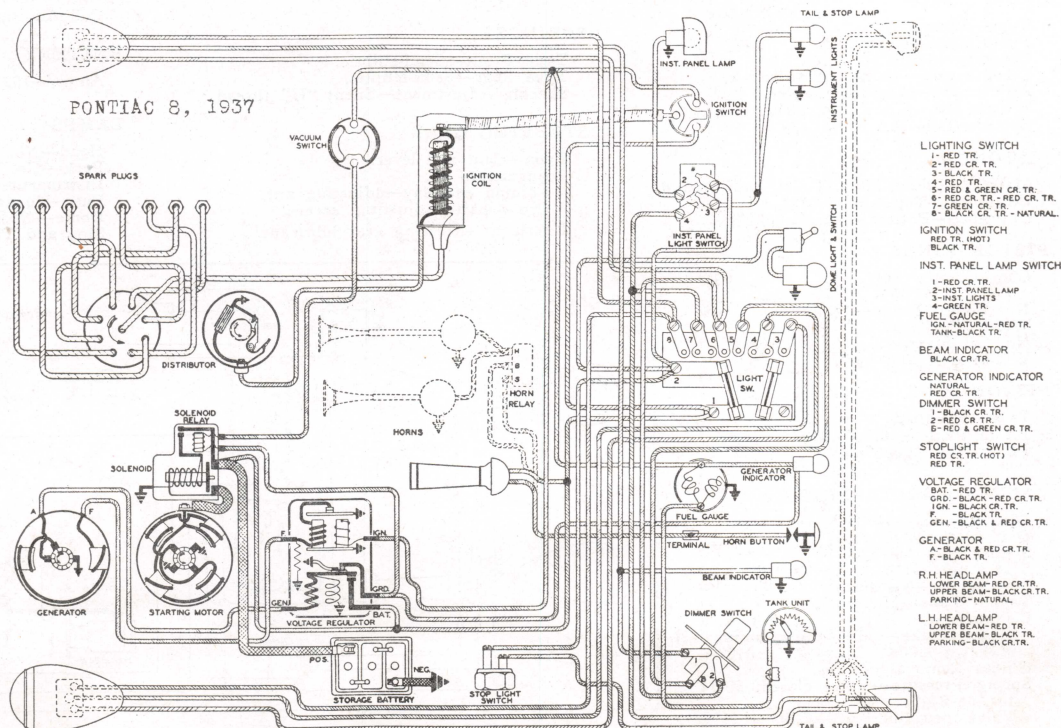
Distributor—Delco-Remy 663-X.  
Coil—Delco-Remy 539-L.  
Distr. Rotation—Clockwise viewing drive end.  
Breaker Gap—.015".  
Brush Spr. Tension—17-21 oz.  
Sp. Plug Gap—.025".  
Sp. Plug Size—A. C. "K-7".  
Manual Advance— $20^{\circ}$  engine.  
Automatic Adv.— $28^{\circ}$  engine at 4200 engine r.p.m. Vacuum adv.,  $20^{\circ}$  engine.  
Timing— $2^{\circ}$ - $6^{\circ}$  before top dead center.  
Coil Amps., Engine Idling—2.0.  
Coil Amps., Engine Stopped—3.5.

### BATTERY

Amps.—110 Amp hours.

### LAMPS

Head—No. 2320-L.  
Park—No. 55.  
Instrument—No. 55.  
Fuse—Yes.  
Dome—No. 81.  
Stop and Tail—No. 87 and No. 63.









# Studebaker 6, 1938

MODEL 7-A AND COMMANDER 8-A

## ENGINE

### DATA

No. of Cylinders—6.  
Bore— $3\frac{9}{16}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—26.35.  
Displacement—226 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—90 at 3400 r.p.m.

### CAMSHAFT

Drive—By gears—helical tooth.  
Chain Data—Not given.  
Valve Timing—Gear marks opposite each other.  
Bearings—4—replaceable.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—Front .00075"-.00225"; others .002"-.00375".

### CONNECTING RODS

End Clearance—.005"-.009".  
Dia. Clearance—.0005"-.002".

### COOLING SYSTEM

Capacity— $14\frac{1}{2}$  qts.  
Pump Drive—Fan belt.  
Belt Size— $38\frac{1}{2}$ " V— $47\frac{1}{2}$ " x  $1\frac{3}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—4.  
Material—Steel-backed babbit.  
End Thrust Taken On—Front bearing, adjustable.  
End Clearance—.003"-.006".  
Dia. Clearance—.0005"-.0025".

### FUEL SYSTEM

Carburetor Make—Stromberg BXO-26.  
Type—Downdraft single.  
Adjustment—Turn out for rich and in for lean mixture.  
Fuel Delivery—A. C. camshaft pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Spiral gear.  
Capacity— $5\frac{1}{2}$  qts.  
Oil Pressure—40 lbs. at 25 to 30 m.p.h.  
Adjustment—Not given.  
Winter Oil—S.A.E. 20; S.A.E. 10 extreme.  
Summer Oil—S.A.E. 30; S.A.E. 40 extreme.

### PISTONS

Material—Lynite—Tin-plated and cam-ground.  
Clearance—Top—.016"-.019" radial.  
Clearance—Bottom—.0015" selective.

### PISTON RINGS

Gap—Comp. .013"-.018"; Oil .013"-.021".  
No. Comp. Rings—2.  
Width— $\frac{3}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0001"-.0003" selective.  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ ".  
Tappet Type—Cylindrical.  
Intake—.016" cold.  
Exhaust—.020" cold.  
.020 cold for valve timing.  
Guides Removable—Yes.  
Spring Pressure—57-62 lbs. at  $2\frac{3}{32}$ ".  
125-135 lbs. at  $1\frac{1}{4}$ ".

## CHASSIS

### FRONT AXLE

Caster— $-\frac{1}{4}$ ° +  $\frac{1}{4}$ °.  
Camber— $\frac{1}{2}$ " normal.  
Toe-in— $\frac{1}{8}$ "  $\frac{1}{32}$ ".  
Kingpin Angle— $5\frac{1}{2}$ °.  
Tie Rod Adj.—Thread.

### REAR AXLE

Type—Spicer semi-floating hypoid.  
Pinion Bearing Type—Timken { 02872-02820  
31593-31520

Adjustment—Shims.  
End Play—Slight drag.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken No. 25577-25523.  
Adjustment—Shims.  
End Play—.008"-.010" draw.  
Lubricant Capacity—Housing—3 pts.

### TRANSMISSION

Make and Type—Warner gear, 3-speed.  
Main Shaft Bearing Type and No.—Ball No. 1207.  
Countershaft Bearing Type and No.—Bantam roller, No. 22-C—407Q.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Front shoe woven, rear shoe moulded.  
Lining Size— $19\frac{1}{16}$ " x 2" x  $\frac{3}{4}$ ".  
Adjustments—Eccentric for lining clearance.  
Eccentric anchor for each shoe.  
Clearance  
Top—.010" at cylinder head.  
Bottom—.005" at anchor.  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—Borg & Beck.  
Facing Type—Woven and moulded.  
Pilot Bearing Type and No.—Comp. E— $\frac{3}{4}$ " I. D. x  $\frac{7}{8}$ " long.  
Throwout Bearing Type and No.—Bearings Co. No. 4375A, or Bantam No. 314A.

### SPRINGS

Type Front—Transverse semi-elliptic.  
Type Rear—Longitudinal semi-elliptic.  
Shackle Adjustment—Threaded "U."

### STEERING GEAR

Type—Ross cam and twin lever.  
Adjustments  
Column end play—shims under top cover.  
Cross-shaft end play—adjusting screw in side housing cover.  
Lubricant—Special steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5-6 volts at 5000 r.p.m.  
Lock Torque—12 ft. lbs., 600 amps., 3 volts.  
Brush Spring Tension—42-53 oz., with new brushes.

### GENERATOR

Make—Auto-Lite.  
Drive—V-belt.  
Regulation—3rd brush and voltage regulation.  
Thermostat—None.  
Output, cold—25 amps. at 8 volts at 2400 r.p.m.  
Output, hot—22 amps at 8 volts at 2800 r.p.m.  
Brush Spring Tension—24-36 oz. with new brushes.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.4 volts at 7.8 m.p.h.  
Amps. Discharge to Open—1.  
Field Fuse—5 amps.

### IGNITION

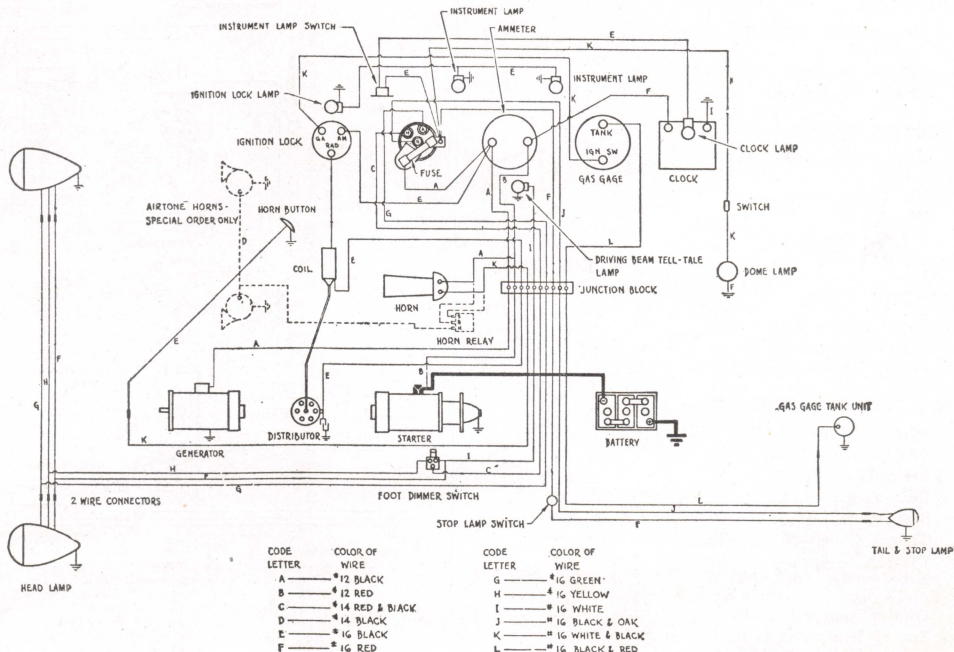
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise viewed from top.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.0225"-.0275".  
Spark Plug Size—18 m/m Champion No. 8.  
Manual Advance—None.  
Automatic Adv.—11 degs. cam.  
Vacuum Adv.—6 degs. cam.  
Timing—2° before top dead center.  
Coil Amps., Engine Idling— $\frac{1}{2}$ -1 $\frac{1}{2}$ .  
Coil Amps., Engine Stopped—4-5.

### BATTERY

Amps.—105 amp. hr., Willard.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—30 amps. on light control switch.  
Dome—No. 81.  
Stop and Tail—No. 1158.





# Studebaker President 8, 1938

## MODEL 4-C

### ENGINE

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable H. P.—30.0.  
Displacement—250.4 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—110 at 3600 r.p.m.

#### CAMSHAFT

Drive—Helical gears.  
Chain Data—Not given.  
Valve Timing—Gear marks opposite each other.  
Bearings—6—replaceable.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—Front .00075"-.00225"; all others .002"-.00375".

#### CONNECTING RODS

End Clearance—.005"-.010".  
Dia. Clearance—.00075"-.00275".

#### COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Fan belt.  
Belt Size—38"V— $47\frac{1}{2}$ " x  $1\frac{3}{16}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

#### CRANKSHAFT

No. Bearings—9.  
Material—Steel-backed babbitt.  
End Thrust Taken On—Front bearing, adjustable.  
End Clearance—.003"-.006".  
Dia. Clearance—.001"-.003".

#### FUEL SYSTEM

Carburetor Make—Stromberg AAO—161.  
Type—Dual downdraft.  
Adjustment—Turn out for richer, in for leaner mixture.  
Fuel Delivery—A. C. camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Spiral gear.  
Capacity—8 qts.  
Oil Pressure—40 lbs. at 25 to 30 m.p.h.  
Adjustment—Not given.  
Winter Oil—S.A.E. 20; S.A.E. 10 extreme.  
Summer Oil—S.A.E. 30; S.A.E. 40 extreme.

#### PISTONS

Material—Lynite—Tin-plated, cam-ground.  
Clearance—Top—.016"-.018" radial.  
Clearance—Bottom—.0015" selective.

#### PISTON RINGS

Gap—Comp. .013"-.018"; Oil .013"-.021".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Clamped in rod.  
Fit in Piston—.0001"-.0003" selective.  
Fit in Rod—Clamp fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ ".  
Tappet Type—Mushroom.  
Clearance—Intake—.016" cold.  
Exhaust—.020" cold.  
.020" cold for valve timing.  
Guides Removable—Yes.  
Spring Pressure—57-62 lbs. at  $2\frac{3}{32}$ ".  
125-135 lbs. at  $1\frac{3}{4}$ ".

### CHASSIS

#### FRONT AXLE

Caster— $-\frac{1}{4}$ " +  $\frac{1}{2}$ ".  
Camber— $\frac{1}{8}$ " normal.  
Toe-in— $\frac{1}{8}$ "- $\frac{7}{32}$ ".  
Kingpin Angle—5 $\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Spicer semi-floating hypoid.  
Pinion Bearing Type—Timken } 02872-02820  
Adjustment—Shims. } 31593-31520  
End Play—Slight drag.  
Lash—.003"-.005".  
Diff. Bearing Type—Timken No. 25577-25523.  
Adjustment—Shims.  
End Play—.008"-.010" draw.  
Lubricant Capacity—Housing—3 pts.

#### TRANSMISSION

Make and Type—Warner gear, 3-speed.  
Main Shaft Bearing Type and No.—Fed. 1207CG-1207F.  
Countershaft Bearing Type and No.—Ban. 22C407Q.

#### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Front shoe woven, rear shoe moulded.  
Lining Size— $19\frac{1}{16}$ " x  $2\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for lining clearance.  
Eccentric anchor for each shoe.  
Clearance  
Top—.010" at cylinder head.  
Bottom—.005" at anchor.  
Brake Effort—55% front, 45% rear.

#### CLUTCH

Type—Long, semi-centrifugal.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Hyatt roller No. 13032.  
Throwout Bearing Type and No.—Bearings Co. No. 4375A, or Bantam No. 314A.

#### SPRINGS

Type Front—Transverse semi-elliptic.  
Type Rear—Longitudinal semi-elliptic.  
Shackle Adjustment—Threaded "U."

#### STEERING GEAR

Type—Ross cam and twin lever.  
Adjustments  
Column end play—shims under top cover.  
Cross-shaft end play—adjusting screw inside housing cover.  
Lubricant—Special steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Delco-Remy.  
Drive—Over-running clutch.  
Rotation—Clockwise viewing pinion.  
No Load—60 amps. at 5 to 6 volts at 5000 r.p.m.  
Lock Torque—15 ft. lbs., 600 amps. at 3 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Delco-Remy.  
Drive—Fan belt.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—26 amps. at 8 volts at 1750 r.p.m.  
Output, hot—26 amps. at 8 volts at 1756 r.p.m., or 21.1 m.p.h.  
Brush Spring Tension—22-26 oz.  
Rotation—Clockwise viewing drive end.  
Cutout to Close—6.4 volts at 9.7 m.p.h.  
Amps. Discharge to Open—1.  
Field Fuse—5 amps.

#### IGNITION

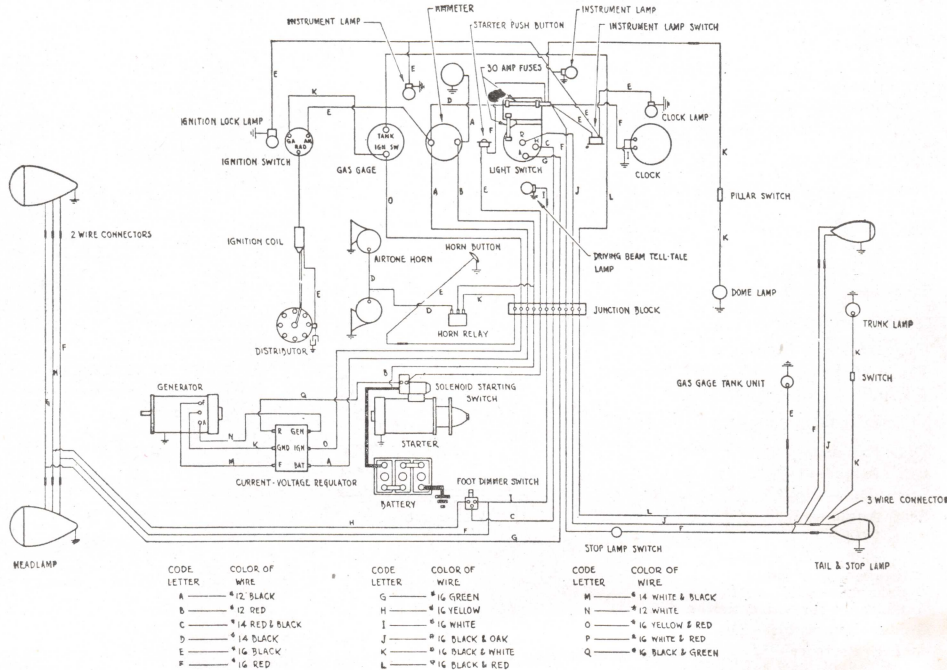
Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise viewed from drive end.  
Breaker Gap—.020".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.0225"-.0275".  
Spark Plug Size—18 m/m Champion No. 8.  
Manual Advance—None.  
Automatic Adv.—13 $\frac{1}{4}$  degs. cam.  
Vacuum Adv.—6 degs.  
Timing—Top dead center.  
Coil Amps., Engine Idling— $\frac{1}{2}$ -1 $\frac{1}{2}$ .  
Coil Amps., Engine Stopped—4-5.

#### BATTERY

Amps.—105 amp. hr.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—30 amps. on light control switch.  
Dome—No. 81.  
Stop and Tail—No. 1158.





# Studebaker Dictator, 1937

## MODEL 5-A

### ENGINE

#### DATA

No. of Cylinders—6, Model 5-A.  
Bore— $3\frac{1}{4}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—25.4.  
Displacement—217.8 cu. in.  
Firing Order—1-5-3-6-2-4.  
Max. H. P.—90 at 3400 r.p.m.

#### CAMSHAFT

Drive—Gears (celeron and cast iron).  
Chain Data—None.  
Valve Timing—Mesh punch marks on gears.  
Bearings—4, replaceable.  
End Thrust Taken On—Thrust plate front end.  
Bearing Clearance—Front .00075"-.00225";  
balance .002"-.00375".

#### CONNECTING RODS

End Clearance—.005"-.009".  
Dia. Clearance—.0005"-.002".

#### COOLING SYSTEM

Capacity—13 qts.  
Pump Drive—Belt.  
Belt Size—38"V,  $44\frac{3}{8}$ "x  $3\frac{3}{4}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

#### CRANKSHAFT

No. Bearings—4.  
Material—Steel backed babbit.  
End Thrust Taken On—Front.  
End Clearance—.003"-.006".  
Dia. Clearance—.0005"-.0025".

#### FUEL SYSTEM

Carburetor Make—Stromberg "EX 23".  
Type—Downdraft single.  
Adjustment—Turn adjusting screw in to lean and out to enrich mixture.  
Fuel Delivery—Camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Spiral gear.  
Capacity— $5\frac{1}{2}$  qts.  
Oil Pressure—40 lbs. at 25.30 m.p.h.  
Adjustment—Relief valve.  
Oil—  
Summer—S.A.E. 30; S.A.E. 40 (extreme).  
Winter—S.A.E. 20; S.A.E. 10 (extreme).

#### PISTONS

Material—Lynite No. 132 T-slot, cam ground.  
Clearance—Top—.016"-.018".  
Clearance—Bottom—.0015" selector.

#### PISTON RINGS

Gap—.013"-.018".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0001"-.0003".  
Fit in Rod—Clamp fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle—45°.  
Seat Width— $\frac{3}{32}$ ".  
Tappet Type—Cylindrical.  
Clearance—Intake—.016" cold.  
Exhaust—.016" cold.  
.020" cold for valve timing.  
Guides Removable—Yes.  
Spring Pressure—  
Valve closed, 57-62 lbs. at  $2\frac{3}{32}$ ".  
Valve open, 125-135 lbs. at  $1\frac{1}{4}$ ".

### CHASSIS

#### FRONT AXLE

Caster— $1\frac{1}{2}$ "  
Camber— $1\frac{1}{2}$ "  
Toe-in— $\frac{1}{16}$ "- $\frac{1}{8}$ "  
Kingpin Angle—9°  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Spicer, semi-floating hypoid.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Adjust to slight drag.  
Lash—.005"-.007".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Adjust to slight drag.  
Lubricant Capacity—Housing—3 pts. special hypoid lubricant.

#### TRANSMISSION

Make and Type—Warner gear 3-speed, helical gears.  
Main Shaft Bearing Type and No.—Federal No. 1207.  
Countershaft Bearing Type and No.—Bantam C407Q.

#### BRAKES

Type—Lockheed Hydraulic.  
Lining Type—Front shoe woven, rear shoe moulded.  
Lining Sizes— $19\frac{1}{16}$ "x  $1\frac{1}{4}$ "x  $\frac{3}{16}$ ".  
Adjustments—Cam adjustment for lining wear. Eccentric anchor adjustment.  
Clearance—Top—.010".  
Bottom—.005".  
Brake Effort—55% front; 45% rear.

#### CLUTCH

Type—B. & B. single plate.  
Facing Type—Moulded and woven.  
Pilot Bearing Type and No.— $\frac{3}{4}$ "x  $\frac{7}{8}$ " Compo. E.  
Throwout Bearing Type and No.—BCA-403A.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Threaded "U".

#### STEERING GEAR

Type—Ross cam and twin lever.  
Adjustments—  
Column end play—shims under top cover.  
Cross shaft end play—adjusting screw in side cover.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite.  
Drive—Over running clutch.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amp., 5 to 6 volts, 5000 r.p.m.  
Lock Torque—16 ft. lbs., 640 amps., 3.2 volts.  
Brush Spring Tension—24-28 oz.

#### GENERATOR

Make—Auto-Lite.  
Drive—V-Belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—  
Lights off, 19 amps., 6-8½ volts, 2000 r.p.m.  
Lights on, 10 amps., 6-8½ volts, 2000 r.p.m.  
Output, hot—  
Lights off, 17 amps., 6-8½ volts, 20.6 m.p.h.  
Lights on, 8 amps., 6-8½ volts, 20.6 m.p.h.  
Brush Spring Tension—18-22 oz.  
Rotation—Clockwise, viewing from drive end.  
Cutout to Close—6.4 volts at 7 to 8 m.p.h.  
Amps. Discharge to Open—1.  
Field Fuse— $7\frac{1}{2}$  amps.

#### IGNITION

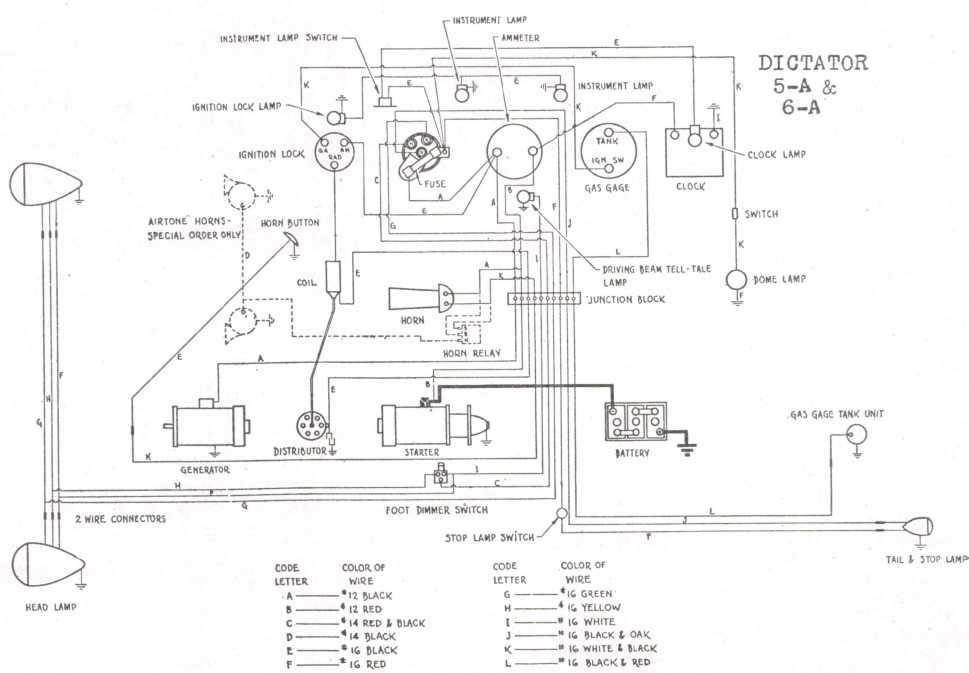
Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.0225"-.0275".  
Spark Plug Size—18 m/m Champion No. 8.  
Manual Advance—None.  
Automatic Advance—21° max.  
Vacuum Advance—12° max.  
Timing— $9\frac{1}{4}$ " before upper dead center in vibration dampener.  
Coil Amps., Engine Idling— $\frac{1}{2}$ -1½.  
Coil Amps., Engine Stopped—4-5.

#### BATTERY

Amps—Willard 105 amp. hrs.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—30 amps.  
Dome—No. 8.  
Stop and Tail—No. 1158.





# Studebaker President 1937

## MODEL 3-C

### ENGINE

### CHASSIS

### ELECTRICAL DATA

#### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable H. P.—30.0.  
Displacement—250.4 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—115 at 3600 r. p. m.

#### CAMSHAFT

Drive—Gears.  
Valve Timing—Mesh punch marks on gears.  
Bearings—6, replaceable.  
End Thrust Taken On—Thrust plate, front end.  
Bearing Clearance—Front, .00075" - .00225"; balance, .002" - .00375".

#### CONNECTING RODS

End Clearance—.005" - .010".  
Dia. Clearance—.00075" - .00275".

#### COOLING SYSTEM

Capacity—16 qts.  
Pump Drive—Generator coupling.  
Belt Size—38" V -  $49\frac{1}{4}$ " x  $2\frac{1}{32}$ ".  
Belt Adjustment—Fan mounting.  
Pump Pack, Adj.—Thread.

#### CRANKSHAFT

No. Bearings—9.  
Material—Steel baked babbit.  
End Thrust Taken On—Front.  
End Clearance—.003" - .006".  
Dia. Clearance—.001" - .003".

#### FUEL SYSTEM

Carburetor Make—Stromberg "EE1."  
Type—Down draft dual.  
Adjustment—Turn adjustment in to lean and out to enrich mixture.  
Fuel Delivery—Camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Spiral gear.  
Capacity—8 qts.  
Oil Pressure—40 lbs. at 25-30 m. p. h.  
Adjustment—Relief valve.  
Winter Oil—S.A.E. No. 20; S.A.E. No. 10 (extreme).  
Summer Oil—S.A.E. No. 30; S.A.E. No. 40 (extreme).

#### PISTONS

Material—Lynite No. 132, T-slot, cam ground.  
Clearance—Top—.015" - .018".  
Bottom—.0015" selective.

#### PISTON RINGS

Gap—Comp. .013" - .018"; oil .013" - .021".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Clamped in rod.  
Fit in Piston—.0001" - .0003".  
Fit in Rod—Clamp fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem Dia.— $1\frac{1}{32}$ ".  
Seat Angle— $45^\circ$ .  
Seat Width— $\frac{3}{32}$ ".  
Tappet Type—Mushroom.  
Clearance—Intake—.016" cold.  
.020" cold for valve timing.  
Exhaust—.016" cold.  
Guides Removable—Yes.  
Spring Pressure—57-62 lbs. at  $2\frac{3}{32}$ ".  
125-135 lbs at  $1\frac{1}{4}$ ".

#### FRONT AXLE

Caster— $\frac{1}{4}$ " -  $+\frac{1}{2}$ ".  
Camber— $\frac{1}{2}$ " normal.  
Toe-in— $\frac{1}{16}$ " -  $\frac{1}{8}$ ".  
Kingpin Angle— $5\frac{1}{2}$ ".  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Spicer semi-floating, hypoid.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Adjust to slight drag.  
Lash—.003" - .005".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Adjust to slight drag.  
Lubricant Capacity—Housing— $3\frac{1}{2}$  pts., special hypoid lubricant.

#### TRANSMISSION

Make and Type—Warner gear, 3 speed, helical gears.  
Main Shaft Bearing Type and No.—Federal 1208.  
Countershaft Bearing Type and No.—Hyatt R. A. 145.

#### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Front shoe, woven; rear shoe, moulded.  
Lining Size— $21\frac{1}{2}$ " x  $1\frac{1}{4}$ " x  $\frac{1}{4}$ ".  
Adjustments  
Cam adjustment for lining wear.  
Eccentric anchor adjustment.  
Clearance—Top—.010".  
Bottom—.005".  
Brake Effort—55% front; 45% rear.

#### CLUTCH

Type—Long, single plate.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Hyatt No. 13032.  
Throwout Bearing Type and No.—Bantam R-154A.

#### SPRINGS

Type Front—Transverse semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Harris rubber.

#### STEERING GEAR

Type—Ross cam and twin lever.  
Adjustments  
Column end play, shims under top cover.  
Cross-shaft end play, adjusting screw in side cover.  
Lubricant—Steering gear lubricant.

#### STARTING MOTOR

Make—Delco-Remy.  
Drive—Over-running clutch.  
Rotation—Clockwise, viewing drive end.  
No Load—60 amps., 5-6 volts, 5000 r. p. m.  
Lock Torque—15 ft. lbs., 575 amps., 3.2 volts.

#### GENERATOR

Make—Delco-Remy.  
Drive—Gear.  
Regulation—Voltage regulator.  
Thermostat—None.  
Output, cold—Lights off, 21 amps., 6-8½ volts, 37 m. p. h.  
Lights on, 12 amps., 6-8½ volts, 37 m. p. h.  
Output, hot—Lights off, 17 amps., 6-8½ volts, 37 m. p. h.  
Lights on, 8 amps., 6-8½ volts, 37 m.p.h.  
Rotation—Clockwise, viewing drive end.  
Cutout to close—6.4 volts at 9¼ m. p. h.  
Amps. Discharge to Open—1.  
Field Fuse—1.

#### IGNITION

Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—19-23 oz.  
Spark Plug Gap—.0225" - .0275".  
Spark Plug Size—18 m/m Champion No. 8.  
Manual Advance—None.  
Automatic Advance—27° maximum.  
Vacuum Advance—12° maximum.  
Timing—At top dead center.  
Coil Amps., Engine Idling—½-1½.  
Coil Amps., Engine Stopped—4-5.

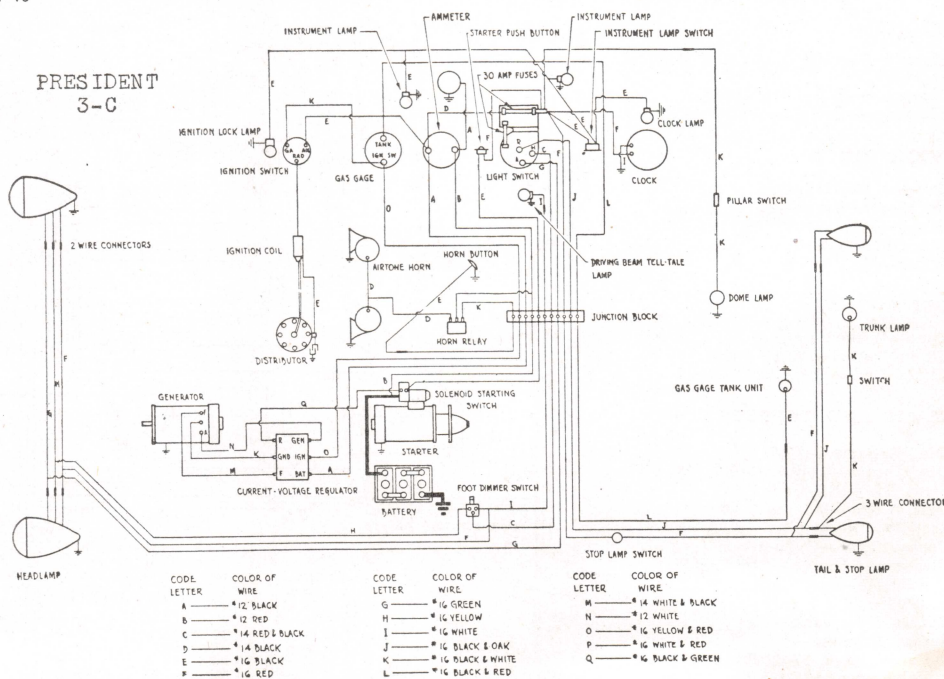
#### BATTERY

Amps.—105 amp. hr.

#### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—30 amps.  
Stop and Tail—No. 1158.  
Dome—No. 81.

PRESIDENT  
3-C





Model 3A Standard Front Axle; Model 4A Independent Wheel Suspension

## ELECTRICAL DATA

## STARTING MOTOR

Make—Auto-Lite.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5 volts, 5000 r.p.m.  
Lock Torque—16 ft. lbs., 640 amps., 3.2 volts.  
Brush Spring Tension—24.28 oz.

## GENERATOR

Make—Auto-Lite.  
Drive—Belt.  
Regulation—Third brush and voltage regulation.  
Thermostat—None.  
Output, cold—19 amps., 6 to 8.5 volts, at 2000 r.p.m.  
Output, hot—17 amps., 6 to 8.5 volts, at 2000 r.p.m.  
Brush Spring Tension—18-22 oz.  
Rotation—Not given.  
Cutout to close—6.4 volts at 7 to 8 m.p.h.  
Amps. Discharge to Open—1.0.  
Field Fuse—5 amps.

## IGNITION

Distributor—Auto-Lite.  
Coil—Auto-Lite.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—Champion 18 m/m.  
Manual Advance—None.  
Automatic Advance—21°.  
Timing— $\frac{3}{64}$ " before top dead center on vibration damper flywheel.  
Coil Amps., Engine Idling—0.5.  
Coil Amps., Engine Stopped—4.0.

## BATTERY

Amps.—102 amp. hr.

## LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—30 amps.  
Dome—No. C 81.  
Stop and Tail—No. 1158.

DRIVING BEAM TELL-TALE

INSTRUMENT

A detailed wiring diagram showing the connection between the gas gauge and the junction block. The gas gauge is represented by a semi-circular symbol with internal components. Wires connect it to a junction block, which is a vertical assembly of terminals. Labels include 'GAS GAUGE', 'JUNCTION BLOCK', and 'STOP LAMP SW'. A terminal on the junction block is labeled 'K'.


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al front end)

front end)

2-WIRE CONNECTORS



The diagram shows a teardrop-shaped component with an arrow pointing to the left. Three vertical lines extend upwards from the top of the teardrop, representing electrical connections.



# Studebaker President, 1936

## ENGINE

### DATA

No. of Cylinders—8.  
Bore— $3\frac{1}{16}$ "  
Stroke— $4\frac{1}{4}$ "  
Taxable H. P.—30.0.  
Displacement—250.4 cu. in.  
Firing Order—1-6-2-5-8-3-7-4.  
Max. H. P.—115 at 3600 r.p.m.

### CAMSHAFT

Drive—Helical gear.  
Chain Data—Not given.  
Valve Timing—Marks on timing gears in line opposite each other.  
Bearings—6, split steel backed, babbitt lined.  
End Thrust Taken On—Thrust plate, front end.  
Bearing Clearance—Front .00075"-.00225"; others .002"-.00375".

### CONNECTING RODS

Steel backed, lead bronze, removal bearings.  
End Clearance—.005"-.010".  
Dia. Clearance—.00075"-.00275".

### COOLING SYSTEM

Capacity—17 qts.  
Pump Drive—Accessory drive shaft.  
Belt Size— $38^{\circ}$ V— $49\frac{1}{4}$ " x  $2\frac{7}{8}$ "  
Belt Adjustment—Fan mounting.  
Pump Pack Adj.—Thread.

### CRANKSHAFT

No. Bearings—9.  
Material—Babbitt lined, interchangeable.  
End Thrust Taken On—Front bearing.  
End Clearance—.003"-.006".  
Dia. Clearance—.001"-.003".

### FUEL SYSTEM

Carburetor Make—Stromberg.  
Type—Downdraft dual.  
Adjustment—Idle—turn out to enrich—in to lean.  
High-speed fixed jets.  
Fuel Delivery—A. C. pump.

### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—8 qts.  
Oil Pressure—Min. high speed 40 lbs.  
Adjustment—Not given.

Winter Oil {  $0^{\circ}$  F. or below..S.A.E. No. 10  
                   $0^{\circ}$  F. to  $45^{\circ}$  F..S.A.E. No. 20  
Summer Oil {  $45^{\circ}$  F. to  $90^{\circ}$  F..S.A.E. No. 30  
                  Above  $90^{\circ}$  F. (high speed).....S.A.E. No. 40

### PISTONS

Material—Alum. alloy, cam ground.  
Clearance—Top—Not specified.  
Clearance—Bottom—7-15 lbs. pull on 1" x .003" feeler.

### PISTON RINGS

Gap—.013"-.018".  
No. Comp. Rings—2.  
Width— $\frac{1}{8}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

### PISTON PINS

Type—Locked in rod.  
Fit in Piston—.0001"-.0003".  
Fit in Rod—Clamp fit.

### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{32}$ ".  
Dia. Intake— $1\frac{1}{32}$ ".  
Stem. Dia.— $1\frac{1}{32}$ ".  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{3}{32}$ ".  
Tappet Type—Mushroom.  
Clearance—Intake—Cold .016".  
                  Exhaust—Cold .016".  
Guides Removable—Yes.  
Spring Pressure—125-135 lbs. at  $1\frac{1}{4}$ " valve open.

## CHASSIS

### FRONT AXLE

Caster— $-\frac{1}{4}^{\circ}$  to  $+\frac{1}{2}^{\circ}$ .  
Camber— $1\frac{1}{2}^{\circ}$ .  
Toe-in— $\frac{3}{16}$ ".  
Kingpin Angle— $9\frac{1}{2}^{\circ}$ .  
Tie Rod Adjustment—Thread.

### REAR AXLE

Type—Semi-elliptic, spiral bevel.  
Pinion Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given (slight drag specified).  
Lash—.002"-.004".  
Diff. Bearing Type—Taper roller.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing—4 pts.  
Summer—S.A.E. No. 110.  
Winter—S.A.E. No. 90.

### TRANSMISSION

Make and Type—Synchro-mesh with over-drive (optional).  
Main Shaft Bearing Type and No.—Fed. No. 1208 and 1209.  
Countershaft Bearing Type and No.—Hyatt, R. A. 145.

### BRAKES

Type—Lockheed hydraulic.  
Lining Type—Woven.  
Lining Size— $25"$  x  $1\frac{3}{4}"$  x  $\frac{1}{4}"$ .  
Adjustments—Cam for clearance.  
Eccentric anchor.  
Clearance  
Top—.010".  
Bottom—.005".  
Brake Effort—55% front, 45% rear.

### CLUTCH

Type—Long single plate.  
Facing Type—Composition.  
Pilot Bearing Type and No.—Hyatt No. 13032.  
Throwout Bearing Type and No.—Ban. R. 154A.

### SPRINGS

Type Front—Semi-elliptic, transverse.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Thread.

### STEERING GEAR

Type—Ross, cam and lever.  
Adjustments  
Column end-play—adjusting nut.  
Cross-shaft—adjusting screw.  
Lubricant—Special steering gear lubricant.

## ELECTRICAL DATA

### STARTING MOTOR

Make—Delco-Remy.  
Drive—Bendix.  
Rotation—Clockwise viewing drive end.  
No Load—60 amps., 5 volts, 5000 r.p.m.  
Lock Torque—15 ft. lbs., 575 amps., 3.2 volts.  
Brush Spring Tension—24-28 oz.

### GENERATOR

Make—Delco-Remy.  
Drive—Belt.  
Regulation—Third brush and voltage control.  
Thermostat—None.  
Output, cold—21 amps., 6 to 8.5 volts, 2800 r.p.m.  
Output, hot—17 amps., 6 to 8.5 volts, 2800 r.p.m.  
Brush Spring Tension—14-18 oz.  
Rotation—Not specified.  
Cutout to Close—6.4 volts at 9.25 m.p.h.  
Amps. Discharge to Open—1.0.  
Field Fuse—None.

### IGNITION

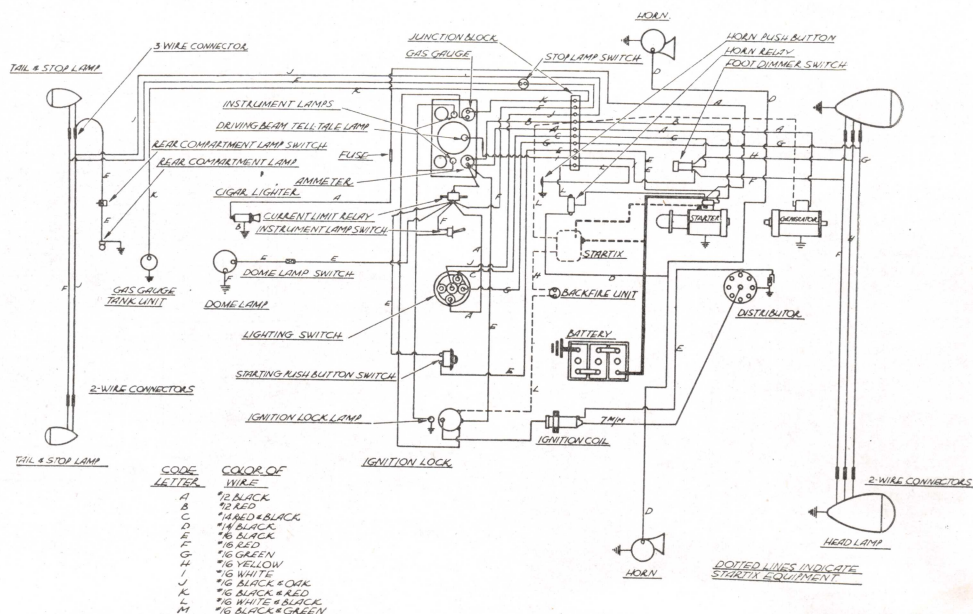
Distributor—Delco-Remy.  
Coil—Delco-Remy.  
Distr. Rotation—Counter-clockwise.  
Breaker Gap—.020".  
Brush Spring Tension—19-23 oz..  
Spark Plug Gap—.025".  
Spark Plug Size—Champion 18m/m.  
Manual Advance—None.  
Automatic Advance— $27^{\circ}$  crankshaft.  
Timing—Top dead center.  
Coil Amps., Engine Idling—.05.  
Coil Amps., Engine Stopped—4.0.

### BATTERY

Amps.—102 amp. hr.

### LAMPS

Head—No. 2331.  
Park—No. 55.  
Instrument—No. 51.  
Fuse—Current limit relay.  
Dome—No. C81.  
Stop and Tail—No. 1158.





# Willys, 1938

## MODEL 38

### ENGINE

#### DATA

No. of Cylinders—4.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—15.63.  
Displacement—134.2 cu. in.  
Firing Order—1-3-4-2.  
Max. H. P.—48 at 3200 r.p.m.

#### CAMSHAFT

Drive—Link belt chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marks in line opposite each other.  
Bearings—4, front removal only.  
End Thrust Taken On—Spring loaded plunger.  
Bearing Clearance—.0015"-.0025".

#### CONNECTING RODS

End Clearance—.004"-.009".  
Dia. Clearance—.001".

#### COOLING SYSTEM

Capacity—Not given.  
Pump Drive—Fan belt.  
Belt Size— $42^{\circ}$ V— $42\frac{1}{32}$ " x  $2\frac{1}{32}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack. Adj.—Thread.

#### CRANKSHAFT

No. Bearings—3.  
Material—Steel back, babbit lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.006".  
Dia. Clearance—.001"-.0025".

#### FUEL SYSTEM

Carburetor Make—Tillotson U-I-A.  
Type— $1\frac{1}{8}$ " downdraft, single.  
Adjustment—Idle, 1 turn open; out, rich.  
High speed  $2\frac{3}{8}$  turns open; turning out gives richer mixture.  
Fuel Delivery—Camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Internal gear.  
Capacity—4 qts.  
Oil Pressure—30 lbs. at 30 m.p.h.  
Adjustment—Shims under relief valve spring.  
Winter Oil—20W; Extra Winter 10W.  
Summer Oil—S.A.E. 30.

#### PISTONS

Material—Cast-iron, light weight.  
Clearance—Top—.016".  
Clearance—Bottom—.0025"-.003".

#### PISTON RINGS

Gap—Top .010"-.008"; .013" all other rings.  
No. Comp. Rings—3.  
Width— $\frac{3}{32}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—.0002"-.0004".  
Fit in Rod—.0004"-.0006".

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{15}{32}$ ".  
Dia. Intake— $1\frac{17}{32}$ ".  
Stem Dia.— $.371\frac{1}{2}$ ".  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—.004" { .010" cold for valve timing.  
Exhaust—.006" {  
Guides Removable—Yes.  
Spring Pressure— $46\frac{1}{2}$  lbs. at  $2\frac{1}{4}$ ".  
85½ lbs. at  $1\frac{15}{16}$ ".

### CHASSIS

#### FRONT AXLE

Caster— $3^{\circ}$ .  
Camber— $2^{\circ}$  or  $2\frac{1}{32}$ ".  
Toe-in— $\frac{1}{32}$ ".  
King Pin Angle— $7\frac{1}{2}^{\circ}$ .  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Semi-floating, spiral bevel.  
Pinion Bearing Type—Timken { 02474-02420  
3193-3120  
Adjustment—Shims.  
End Play—1" resistance at 15" leverage.  
Lash—.005"-.010" measured at outside of ring gear.  
Diff. Bearing Type—Timken 16284-16150.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing— $1\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Warner Model T84C.  
Main Shaft Bearing Type and No.—Federal No. 1207 and 1305 C.G.F.  
Countershaft Bearing Type and No.—Bronze bushing.

#### BRAKES

Type—Bendix mechanical.  
Lining Type—Moulded.  
Lining Size— $19\frac{3}{16}$ " x  $1\frac{1}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding type anchor.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—45% front; 55% rear.

#### CLUTCH

Type—Rockford (B. & B.) disc.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Bronze.  
Throwout Bearing Type and No.—Bearings Co. No. 4768A.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent "U."

#### STEERING GEAR

Type—Gemmer worm and sector.  
Adjustments—Not given.  
Lubricant—Special steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite—MZ 4049.  
Drive—Bendix.  
Rotation—Clockwise, viewing pinion.  
No Load—70 amps. max., 5.5 volts at 4300 r.p.m.  
Lock Torque—11.8 ft. lbs., 400 amps., 4 volts.  
Brush Spring Tension—40-44 oz.

#### GENERATOR

Make—Auto-Lite—GAM 4505.  
Drive—Fan belt.  
Thermostat—None.  
Regulation—Third brush.  
Output, cold—17 amps. at 8 volts at 2400 gen. r.p.m.  
Output, hot—12½ amps. at 8 volts at 2350 r.p.m.  
Brush Spring Tension—18-22 oz.  
Rotation—Counter-clockwise, viewing drive end.  
Cutout to Close—7 to 7.5 volts at 12 m.p.h.  
Amps. Discharge to Open—0.5-2.5.  
Field Fuse—None.

#### IGNITION

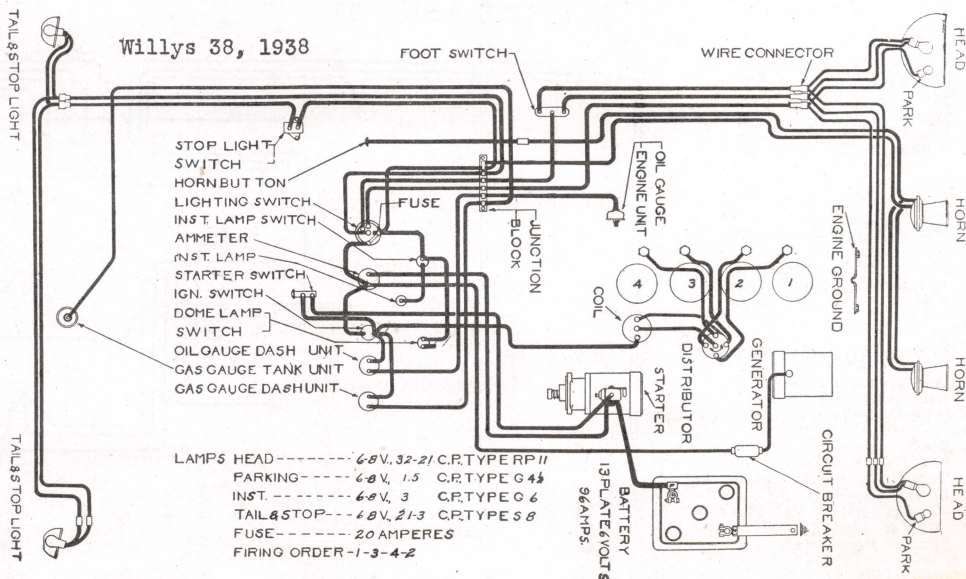
Distributor—Auto-Lite—IGS 4007.  
Coil—Auto-Lite—IG 4090.  
Distr. Rotation—Clockwise, viewed from top.  
Breaker Gap—.020".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—18 m/m Champion "C7."  
Manual Advance—None.  
Automatic Advance—28 degs. at 3400 r.p.m.  
Vacuum Advance—20 degs.  
Timing—5 degs. or .0103" piston travel after top dead center.  
Coil Amps., Engine Idling—2.5 at 6 volts and 400 r.p.m.  
Coil Amps., Engine Stopped—4 at 7.8 volts.

#### BATTERY

Amps.—96 amp. hr.

#### LAMPS

Head—No. 2320.  
Park—No. 55.  
Instrument—3 c. p.—6-8 v.  
Fuse—20 amps.  
Dome—Not specified.  
Stop and Tail—21 and 3 c. p.—6-8 v.





# Willys, 1937

## MODEL 37

### ENGINE

#### DATA

No. of Cylinders—4.  
Bore— $3\frac{1}{8}$ "  
Stroke— $4\frac{3}{8}$ "  
Taxable H. P.—15.63.  
Displacement—134.2 cu. in.  
Firing Order—1-3-4-2.  
Max H. P.—48 at 3200 r.p.m.

#### CAMSHAFT

Drive—Link belt chain.  
Chain Data—47 links,  $1\frac{1}{4}$ " wide,  $\frac{1}{2}$ " pitch.  
Valve Timing—Sprocket marking; intake opens on top dead center.  
Bearings—4; front removable only.  
End Thrust Taken On—Spring loaded plunger.  
Bearing Clearance—.0015"-.0025".

#### CONNECTING RODS

End Clearance—.006"-.008".  
Dia. Clearance—.002".

#### COOLING SYSTEM

Capacity—11 qts.  
Pump Drive—Fan belt.  
Belt Size— $42^{\circ}$ V— $42\frac{1}{8}$ " x  $2\frac{1}{8}$ ".  
Belt Adjustment—Generator mounting.  
Pump Pack Adj.—Thread.

#### CRANKSHAFT

No. Bearings—3.  
Material—Hard metal back, babbitt lined.  
End Thrust Taken On—Front bearing.  
End Clearance—.004"-.006".  
Dia. Clearance—.002".

#### FUEL SYSTEM

Carburetor Make—Tillotson U-AU-1A.  
Type—Downdraft single.  
Adjustment—Idle,  $\frac{3}{4}$ -1 turn open; out, rich.  
High speed,  $\frac{3}{8}$  turn, open; turning out gives rich mixture.  
Fuel Delivery—Camshaft pump.

#### LUBRICATION

Type—Pressure.  
Pump Type—Gear.  
Capacity—4 qts.  
Oil Pressure—30 lbs. at 30 m.p.h., warm oil.  
Adjustment—Shims under relief valve spring.  
Oil { Summer ..... S.A.E. No. 30  
Winter, Mild ..... S.A.E. No. 20W.  
Winter, Severe ..... S.A.E. No. 10W.

#### PISTONS

Material—Light weight semi-steel.  
Clearance—Top—.007".  
Clearance—Bottom—.0025".

#### PISTON RINGS

Gap—Comp., .007"-.012"; oil, .007"-.015".  
No. Comp. Rings—3.  
Width— $\frac{3}{16}$ ".  
No. Oil Rings—1.  
Width— $\frac{3}{16}$ ".

#### PISTON PINS

Type—Floating.  
Fit in Piston—.0002"-.0004" clearance, hand pressure fit.  
Fit in Rod—.0004"-.0006" clearance, thumb pressure fit.

#### VALVES AND TAPPETS

Dia. Exhaust— $1\frac{1}{8}$ ".  
Dia. Intake— $1\frac{1}{8}$ ".  
Stem Dia.—Int., .372"; Exh., .371".  
Seat Angle— $45^{\circ}$ .  
Seat Width— $\frac{1}{16}$ ".  
Tappet Type—Mushroom.  
Clearance—Hot:  
Intake—.004" { Valve tim'g  
Exh't—.006" { .010" cold.  
Spring Pressure—  
46 lbs. at  $2\frac{1}{4}$ ".  
85½ lbs. at  $1\frac{1}{4}$ ".  
Free length  $2\frac{1}{16}$ ".

### CHASSIS

#### FRONT AXLE

Caster— $3^{\circ}$ .  
Camber— $2^{\circ}$  or  $2\frac{1}{8}$ ".  
Toe-in— $\frac{3}{8}$ ".  
Kingpin Angle— $7\frac{1}{2}^{\circ}$ .  
Tie Rod Adj.—Thread.

#### REAR AXLE

Type—Spiral bevel, semi-floating.  
Pinion Bearing Type—Timken.  
Adjustment—Shims.  
End Play—1" resistance at 15" leverage.  
Lash—.005"-.010".  
Diff. Bearing Type—Timken.  
Adjustment—Shims.  
End Play—Not given.  
Lubricant Capacity—Housing— $1\frac{1}{4}$  pts.

#### TRANSMISSION

Make and Type—Warner T 84 C. synchro-mesh.  
Main Shaft Bearing Type and No.—No. 1207 and 1305 CGF.  
Countershaft Bearing Type and No.—Graphite bronze.

#### BRAKES

Type—Bendix mechanical.  
Lining Type—Moulded.  
Lining Size— $19\frac{1}{16}$ " x  $1\frac{3}{4}$ " x  $\frac{3}{16}$ ".  
Adjustments—Eccentric for centralizing.  
Adjusting screw for clearance.  
Sliding anchor adjustment.  
Clearance—Top—.010".  
Bottom—.010".  
Brake Effort—45% front; 55% rear.

#### CLUTCH

Type—Single plate; Rockford—Borg & Beck.  
Facing Type—Moulded.  
Pilot Bearing Type and No.—Bronze.  
Throwout Bearing Type and No.—B. C. A. ball.

#### SPRINGS

Type Front—Semi-elliptic.  
Type Rear—Semi-elliptic.  
Shackle Adjustment—Silent-U.

#### STEERING GEAR

Type—Gemmner worm and gear.  
Adjustments  
Column end play—shims.  
Cross-shaft—adjusting screw.  
Lubricant—Steering gear lubricant.

### ELECTRICAL DATA

#### STARTING MOTOR

Make—Auto-Lite No. MZ 4049.  
Drive—Bendix.  
Rotation—Clockwise, viewing pinion.  
No Load—With drive, 70.0 amps. max., 5.5 volts, 4300 r.p.m.  
Lock Torque— $12\frac{1}{4}$  ft lbs. at 4 volts, 540 amps.  
Brush Spring Tension—40-44 oz.

#### GENERATOR

Make—Auto-Lite No. GAM 4504.  
Drive—Fan belt.  
Regulation—Third brush.  
Thermostat—None.  
Output, cold—17 amps. at 8 volts at 2400 generator r.p.m.  
Output, hot— $12\frac{1}{2}$  amps. at 8 volts at 22 m.p.h.  
Brush Spring Tension—18-22 oz.  
Rotation—Counter-clockwise, viewing drive end.  
Cutout to Close—7 to 7.5 volts at 995 r.p.m.  
Amps. Discharge to Open—.5 to 2.5.  
Field Fuse—None.

#### IGNITION

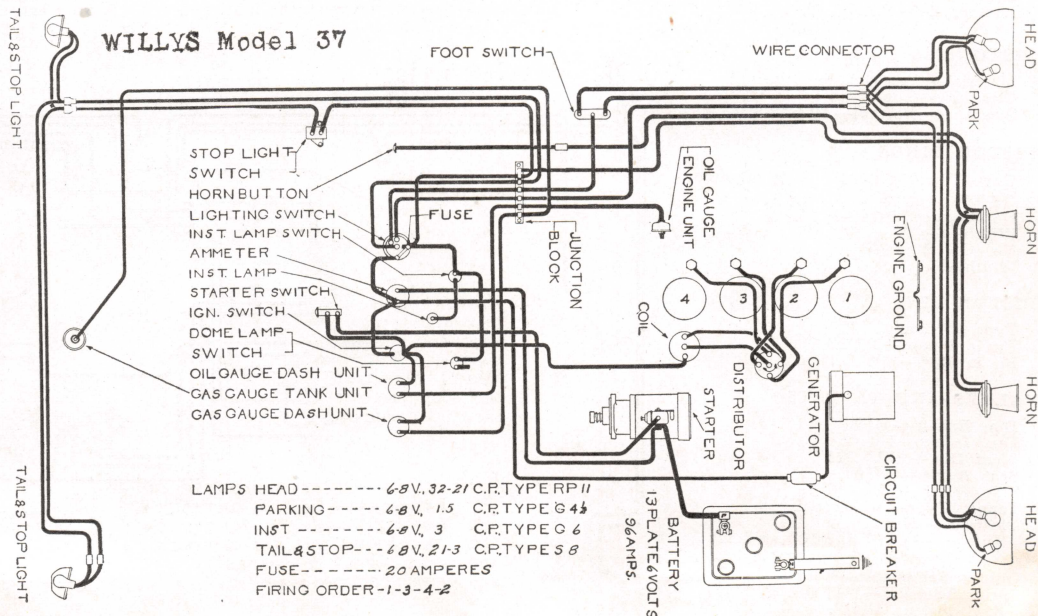
Distributor—Auto-Lite No. IGS 4007.  
Coil—Auto-Lite No. IG 4090.  
Distr. Rotation—Clockwise, viewed from top.  
Breaker Gap—.018".  
Brush Spring Tension—16-20 oz.  
Spark Plug Gap—.025".  
Spark Plug Size—18 m/m.  
Manual Advance—None.  
Automatic Advance— $25^{\circ}$  at 3400 r.p.m.  
Vacuum Advance— $23^{\circ}$ .  
Timing— $5^{\circ}$  or .0103" piston travel after center with automatic spark advance at rest.  
Coil Amps., Engine Idling—2.5 at 6 volts and 400 r.p.m.  
Coil Amps., Engine Stopped—4 at  $78^{\circ}$  Fahr.

#### BATTERY

Amps.—U. S. L., 95 amp. hrs.

#### LAMPS

Head—2320.  
Park—55 (in headlamp).  
Instrument—3 C. P.—6-8 volt.  
Fuse—20 amps.  
Dome—Not specified.  
Stop and Tail—21 and 3 C. P.—6-8 volt.





# How to Read a Wiring Diagram

*A discussion of circuits for the various units with definition of symbols used*

By T. C. STEWART

**U**NDERSTANDING the various circuits of a motor vehicle electrical system as shown on wiring diagrams may not be simple. An important fundamental in tracing circuits is that the circuit is not complete until a return to the source of power is provided. We may define the circuit as a regular or appointed route from point to point—the complete path or extension, any part of the path of current including the source. The word circuit itself suggests a circle and actually the entire electrical system of the car comprises nothing more than a group of such circles or circuits.

Every circuit must have a source of electrical energy or power and a means of controlling the power or current in the circuit, that is, a means of breaking the circuit. The switch is the means of breaking or completing the circuit as desired, while for this discussion we can consider the battery as the source of current.

In Fig. 1-A, is combined the circle which represents the circuit, a battery which is the source of electrical energy and a switch for breaking the circuit. When the switch is closed, the circuit is completed; when the switch is open, the circuit is broken. In this circle we can connect any number of electrical devices and when connected as shown in Fig. 1-B, the devices are said to be connected in parallel. When connected as shown in Fig. 1-C, they are said to be connected in series. If the switch in either of these circuits is closed, the lamps will glow. In Fig. 1-D, we have a series circuit including an ammeter which measures the current flowing in the circuit when the switch is closed.

The circuits shown in the various illustrations of Fig. 1, are completely wired, that is, current flows from the battery to the switch, thence to the lamps and back to the battery through wires. In Fig. 2, illustrations A and

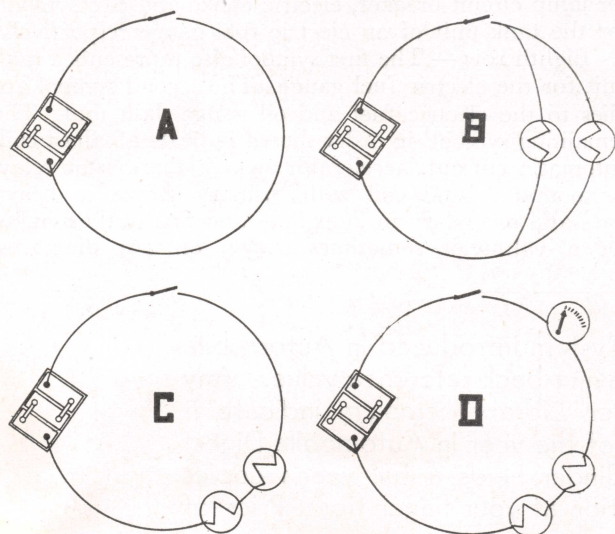


Fig. 1. Diagrams showing development of the electrical circuit in the form of circles. B, indicates units connected in parallel and C, in series

B show the equivalent circuits of Figs. 1-A and 1-B; however, a single wire is used and the circuit is completed through the ground as shown by the dotted lines, the lamps and battery being connected to a metal circuit.

In reading a wiring diagram these simple facts should be kept in mind and in tracing each circuit, the circle forms a convenient means of picturing in mind the path of the current for any circuit. The two-wire system as shown in Fig. 1 is rarely used in automotive practice, the single wire or ground return system as shown in Fig. 2, being employed. We have the same conditions in either two-wire or single wire systems; however, in the latter the wiring forms one side of the circuit

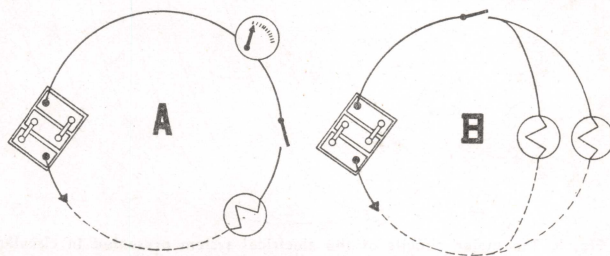


Fig. 2. Circular diagram for series and parallel single wire or ground return system

or half the circle and the metallic parts of the chassis form the other half of the circuit or circle. The important fact is that we must always be able to trace the current from a definite point through the circuit and back to the same point again. Current cannot flow unless there is a continuous path; a break in the circuit, no matter where located will stop the flow of current completely.

If we construct a chassis wiring diagram of the major electrical circuits such as the starting, lighting, horn and ignition units in the form of a circle as shown in Fig. 3, we discover that they are arranged in parallel, a fact which is not evident when viewing the usual wiring diagram. It will be noted that the units connected in parallel include the starting motor, horn, generator, low tension or primary circuit of the ignition system which comprises the ignition switch, coil and breaker mechanism and finally the circuit for the lights.

Tracing each circuit individually from the battery terminal, we find the starting switch is in series with the starting motor; the horn is in series with the horn button; the cut-out is in series with the generator; the coil and distributor are in series with the ignition switch and the lamps in series with the lighting switch. The completion of each circuit is through the ground to the ground strap of the battery and thence to the battery. The lamp circuit has a fuse in series with the switch which protects the light circuits for the head, side and tail lamps, but not the ignition circuit. The light circuits are shown controlled by a single switch as in current practice.

The details of electrical circuits of various cars will vary as there are many wiring schemes and combinations of units and switches which may be employed, but all systems follow closely the simple and fundamental diagram shown in Fig. 3, regardless of how complicated the wiring diagram for the car may appear.

Important to keep in mind is that a single wire being used, all major units are "grounded" and also arranged in parallel. A little consideration of any diagram no matter how complicated will indicate this simple analysis applies in every case. Owing to the separate functions of the starting, ignition, horn, and lighting circuits, these are always controlled by separate switches, al-



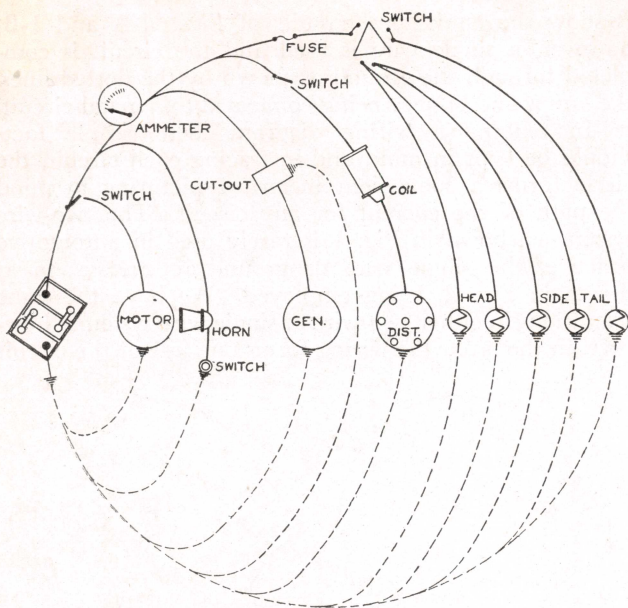


Fig. 3. The major circuits of the electrical system presented in circular form, indicating they are in parallel

though the ignition switch might be included in the lighting system switch unit. Stop lights, signal lights, interior body lights, instrument lights, etc., are generally controlled by separate switches. This is also true of control of head lamp beams, a separate foot switch being used to control the passing beams.

Modern diagrams have most of the important units designated on the diagram; however, there are many symbols employed to eliminate detail and make the diagram compact and knowing the meaning of these symbols makes reading the diagram simple. In Fig. 4, an attempt has been made to present a number of the more generally used symbols.

First row — Reading from left to right we have the familiar plus and minus signs which represent the positive and negative side of the circuit usually appearing on the battery terminals. Next is the symbol which denotes a ground or circuit completed through ground. Then is illustrated a tapped connection; a cross-over or point where two wires not connected cross each other on the diagram. The remaining illustrations show the heavy cable used in the starter circuit, an armored cable as used on the ignition lock wire, a single connector and then a triple connector.

Second row — The arrows show the direction of rotation for the ignition distributor, generator or starting motor. The next three illustrations show symbols which designate a fuse, while the fifth one indicates a spare fuse. The next illustration shows one method of indicating an instrument lamp, then one method of indicating any type of lamp. The second last illustration in the row is the symbol indicating a double filament bulb and the last one a junction block.

Third row — The first two illustrations show symbols employed for the battery; the next three for the ammeter; the next two for the starter switch; then a light switch and finally a foot or beam control switch.

Fourth row — The first three illustrations show symbols for a horn button, the balance a toggle switch, push button switch, dome light switch and the others a stop light switch.

Fifth row — The first symbol is one that is used for any type of switch but more generally intended to indicate a single throw knife switch. The remaining illustrations apply to the ignition system and are respectively condenser, primary winding, secondary winding, resistance, contacts (two illustrations), coil, distributor and a double dealing distributor for system employing two coils.

Sixth row — The first illustration indicates a vibrator type horn. The next six illustrations are generator symbols the fifth illustration in the row indicating a shunt wound machine and the sixth a series wound machine. The eighth illustration shows a circuit breaker and the ninth a grounded brush.

Seventh row — The first symbol indicates a current regulator and the second a voltage regulator. The next three illustrations are symbols for the starting motor

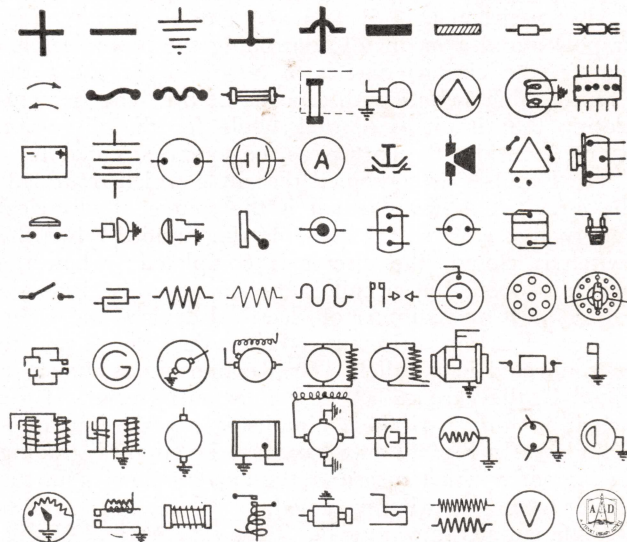


Fig. 4. Showing various symbols which have been used on wiring diagrams

and the remaining illustrations in this row are symbols for lamp circuit breaker, electric choke and two symbols for the tank unit of an electric fuel gauge respectively.

Eighth row — The first symbol also represents a tank unit for the electric fuel gauge. The second symbol applies to the electric fuel and oil gauge dash unit. The remaining symbols in order shown indicate a ballast coil, automatic cut-out, accelerator switch, thermostat relay, compound wound coil with primary shown in heavy lines and secondary in light lines and finally the symbol for a voltmeter sometimes shown on test diagrams.

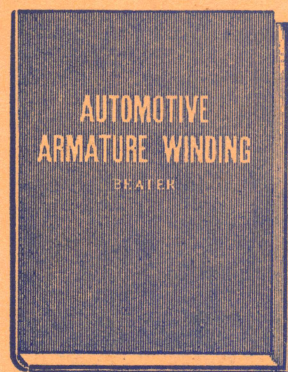


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